Guide for Reporting to the National Pollutant Release Inventory

2002

Canadian Environmental Protection Act, 1999

Canada

Environment Canada Environnement Canada

National and Regional NPRI Offices

Headquarters

National Pollutant Release Inventory
Environment Canada
9th Floor, Place Vincent Massey
351 St. Joseph Blvd.
Hull, QC
K1A 0H3

Tel: (819) 953-1656
Fax: (819) 994-3266
E-mail: NPRI@ec.gc.ca

Newfoundland and Labrador, Prince Edward Island, New Brunswick and Nova Scotia

National Pollutant Release Inventory
Environment Canada
16th Floor, Queen Square
45 Alderney Drive
Dartmouth, NS
B2Y 2N6

Tel: (902) 426-4482 / 426-4805 / 426-5037
Fax: (902) 490-0722
E-mail: NPRI_ATL@ec.gc.ca

Quebec

National Pollutant Release Inventory
Environment Canada
105 McGill Street, 4th Floor
Montreal, QC
H2Y 2E7

Tel: (514) 283-1832 / 283-7303 / 283-0248
Fax: (514) 496-6982
E-mail: INRP_QC@ec.gc.ca

Ontario

National Pollutant Release Inventory
Environment Canada
4905 Dufferin Street, 2nd Floor
Downsview, ON
M3H 5T4

Tel: (416) 739-5994/ 739-4602 / 739-4608 / 739-5894
Fax: (416) 739-4326 / 739-4762 / 739-4251
E-mail: NPRI_ONTARIO@ec.gc.ca

NPRI/ON MOE Reg.127 Joint Technical Assistance Centre

Tel: (416) 739-4707

Manitoba, Saskatchewan, Alberta, Northwest Territories and Nunavut

National Pollutant Release Inventory
Environment Canada
Twin Atria #2, Room 200
4999-98 Avenue
Edmonton, AB
T6B 2X3

Tel: (780) 951-8989
Fax: (780) 495-2615
E-mail: NPRI_PNR@ec.gc.ca

National Pollutant Release Inventory
Environment Canada
123 Main Street, Suite 150
Winnipeg, MB
R3C 4W2

Tel: (780) 951-8989
Fax: (780) 495-2615

National Pollutant Release Inventory
Environment Canada
Room 300, Park Plaza
2365 Albert Street
Regina, SK
S4P 4K1

Tel: (306) 780-6465
Fax: (306) 780-6466

National Pollutant Release Inventory
Environment Canada
3rd Floor, Diamond Plaza
5204 - 50th (Franklin) Avenue
Yellowknife, NT
X1A 2R2

Tel: (867) 669-4727
Fax: (867) 873-8185

National Pollutant Release Inventory
Environment Canada
P.O. Box 607
Iqaluit, NU
X0A 0H0

Tel: (867) 975-4636
Fax: (867) 975-4645

British Columbia and Yukon

National Pollutant Release Inventory
Environment Canada
224 West Esplanade
North Vancouver, BC
V7M 3H7

after April 21, 2003:
#201-401 Burrard Street
Vancouver, BC
V6C 3S5

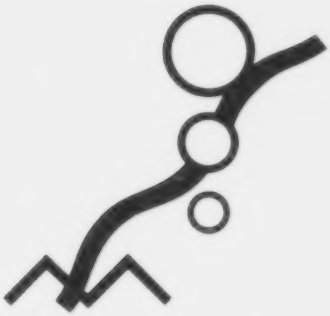
Tel: (604) 666-3221 / 666-3890 / 666-9864
Fax: (604) 666-6800
E-mail: NPRI_PYR@ec.gc.ca

National Pollutant Release Inventory
Environment Canada
91782 Alaska Highway
Whitehorse, YT
Y1A 5B7

Tel: (867) 667-3402
Fax: (867) 667-7962
E-mail: NPRI_YK@ec.gc.ca

NPRI Help Desk

E-mail: nprihelpdesk@ec.gc.ca
Tel: (819) 994-1672
1-877-877-8375



Guide for Reporting to the National Pollutant Release Inventory

2002

Canadian Environmental Protection Act, 1999

Canada

Environment Canada Environnement Canada

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Prepared by: Allison Dunn

In collaboration with: David Allingham, Art Beckett, Catherine Coutu, René Damecour, Geneviève Dubreuil, Brad Fisher, Benoit Godin, Wilfrid Jan, Clarisse Kayisire, Alison Kennedy, François Lavallée, Terry Mah, Patricia Marquis, Chantal Ménard, Jennifer Metcalfe, Claudia Pais, Henry Quon, Michelle Raizenne, Chris Roberts, Christa Seaman, Suzanne Spicer, Nancy Taschuk, James Yacoumidis.

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Disclaimer

Should any inconsistencies be found between this Guide and the official *Canada Gazette* notice and its amendment, the notice published on December 29, 2001 and the amendment published on December 28, 2002, in the *Canada Gazette*, Part I, will prevail.

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Preface

The National Pollutant Release Inventory (NPRI) is at the centre of the Government of Canada's efforts to track toxic substances. It is the only nation-wide, publicly-accessible program of its type in Canada that provides information on pollutants being released to the environment and transferred for disposal. Since its inception in 1992, the role of the NPRI has expanded to include the collection of information on NPRI substances being recycled and pollution-prevention activities.

All non-confidential information collected through the NPRI is available to the public on Environment Canada's Web site at <www.ec.gc.ca/pdb/npri> in the form of downloadable databases, reports and analyses, and through a query site which allows the user to view information submitted by an individual facility.

For the 2002 reporting year, there were 273 substances listed in the NPRI; 58 have been declared toxic under the *Canadian Environmental Protection Act, 1999*. There are 241 substances listed with the original NPRI reporting criteria (10-tonne, manufacture, process and other use reporting threshold with 1% concentration exemption, except for by-products). Thirty-two substances are listed with alternate reporting criteria – mercury, cadmium, arsenic, lead and their compounds, hexavalent chromium compounds, tetraethyl lead, 17 individual polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-*p*-dioxins (dioxins) / polychlorinated dibenzofurans (furans), hexachlorobenzene (HCB), and seven Criteria Air Contaminants (CACs).

This Guide, together with its companion documents – *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory, National Pollutant Release Inventory Guidance Manual for the Wastewater Sector,* and *Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory* – enables facility owners or operators to review the NPRI reporting criteria and determine if they are required to report to the NPRI for the 2002 reporting year. These documents also explain how to complete the reporting form and submit a report to Environment Canada.

Since 2001, Environment Canada has worked with the Ontario Ministry of the Environment (ON MOE) to provide one-window reporting for facilities subject to the NPRI *Canada Gazette* notice and Ontario's O.Reg.127/01. A separate guidance document, *Guide for Reporting under O.Reg.127/01 Using the NPRI Software – 2002*, is available on the NPRI reporting software CD to explain the reporting requirements and the reporting form for those facilities in Ontario required to report under O.Reg.127/01. In addition to Environment Canada's collaboration with the ON MOE and in keeping with the spirit of one-window reporting, beginning in 2002, the NPRI reporting software will enable reporting to Alberta Environment (AENV) to support its *Environmental Protection and Enhancement Act (EPEA)* approvals. Reporting under other Environment Canada programs will also be permitted, including Environmental Performance Agreements (EPAs) and ARET 2. More details on these programs are provided within the body of this Guide.

Cette publication est aussi disponible en français sous le titre de « Guide de déclaration à l'Inventaire national des rejets de polluants – 2002 ».

Highlights and Important Changes for 2002

Report Due Dates

Canada Gazette Notice	Reporting Year	Reporting Deadline
December 29, 2001	2002 calendar year	**June 1, 2003**

An amendment to the *Canada Gazette* notice for the 2002 NPRI was published on December 28, 2002, to revise or clarify certain provisions for 2002.

Correspondence

Correspondence from Environment Canada will be addressed to the company coordinator. If there is no coordinator, correspondence will be sent to the technical contact. Failure to provide correct telephone and facsimile numbers for the contacts could delay receipt of important notices from NPRI offices. See Step 4 – A4.0, A6.0 and A8.0.

Steps / Process for Reporting to the NPRI

This Guide has been organized to walk you through the seven steps required to report to the NPRI for 2002. Included are explanations of the reporting criteria, the reporting form and how to use the software. The steps are outlined in the figure below.

PROCESS FOR REPORTING TO THE NPRI FOR 2002

Step 1 - Determine whether your facility is required to submit an NPRI report to Environment Canada.
NO
Advise your regional NPRI office that you did not meet the reporting criteria for the 2002 NPRI.
YES
Step 2 - Estimate releases and transfers and collect the information required for the NPRI report.
Step 3 - Install the 2002 reporting software and upload data from your 2001 NPRI report (if available).
Step 4 - Enter or update the facility information.
Step 5 - Enter or update the NPRI substance information.
Step 6 - Check for errors, make corrections, export data and print the Statement of Certification.
Step 7 - Sign the Statement of Certification and submit the report to Environment Canada, postmarked, courier-dated or e-mailed, no later than June 1, 2003.
Retain a copy of all information upon which the report was based for three years.

2002 Changes

A substantial number of changes were made to the NPRI for the 2002 reporting year:

New Substances

- hexavalent chromium compounds added with 50 kg and 0.1% concentration reporting threshold (see Step 1, Reporting Criteria for Part 1B Substances)
- seven Criteria Air Contaminants (CACs) added at various release-based thresholds: carbon monoxide, oxides of nitrogen, sulphur dioxide, particulate matter less than or equal to 2.5 microns ($PM_{2.5}$), particulate matter less than or equal to 10 microns (PM_{10}), particulate matter less than 100 microns (total particulate matter), and volatile organic compounds (VOCs)[1] (see Step 1, Reporting Criteria for Part 4 Substances)

Mass-based and Concentration Thresholds

- cadmium[2] reduced from 10 tonnes to 5 kg with 0.1% concentration criterion (see Step 1, Reporting Criteria for Part 1B Substances)
- arsenic[2], lead[3] and tetraethyl lead reduced from 10 tonnes to 50 kg with 0.1% concentration criterion (see Step 1, Reporting Criteria for Part 1B Substances)
- chromium[2] no longer includes reporting of hexavalent chromium (see Step 1, Reporting Criteria for Part 1A Substances)

Activities to Which 20 000-hour Threshold Does Not Apply (see Step 1, Employee Criteria)

Changes to existing activities

- throughput for non-hazardous solid waste incineration and biomedical or hospital waste incineration reduced from 100 tonnes to 26 tonnes

New activities

- terminal operations[4]
- discharge of treated or untreated wastewater from a wastewater collection system with an annual discharge of 10 000 m^3 or more per day, into surface waters

Exemptions *(changes noted in italics)* (see Step 1, Facility Criteria)

- maintenance and repair of transportation vehicles, such as automobiles, trucks, locomotives, ships or aircraft, *except painting and stripping of vehicles or their components, or the rebuilding or remanufacturing of vehicle components*
- distribution, storage, or retail sale of fuels, *except as part of the terminal operations*

Pollution Prevention (P2) (see Step 5, section B30.0)

- reporting of P2 activities expanded

Administrative (see end of Step 1)

- facilities who reported in 2001 must advise Environment Canada if they do not meet the 2002 NPRI reporting criteria

---

[1] refer to Appendix 3 of Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory, for definition of VOCs

[2] and its compounds

[3] and its compounds, except tetraethyl lead (CAS No. 78-00-2); does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

[4] defined as a) the use of storage tanks and associated equipment at a site used to store or transfer crude oil, artificial crude or intermediates of fuel products into or out of a pipeline, or b) operating activities of a primary distribution installation normally equipped with floating roof tanks that receives gasoline by pipeline, railcar, marine vessel or directly from a refinery

Definitions

Revised

- by-product - means a substance which is incidentally manufactured, processed or otherwise used at the facility at *any* concentration, and released on site to the environment, released to surface waters or transferred off site for disposal
- facility - now refers to contiguous facility and pipeline installation (see Step 1, Facility Criteria, for definition of contiguous facility and pipeline installation)
- other use - means any use *or disposal* of a substance, listed in Schedule 1, relevant to the purpose of the facility which is not included under the definitions of "manufacture" or "process"

Reporting to Other Inventory Programs

Reporting to ARET 2

Environment Canada's ARET 2 program is a new and improved voluntary partnership between the Canadian government and industry. This program challenges participants to voluntarily prevent the use and release of toxic substances and other contaminants on the ARET 2 substance list. ARET 2 applies to facilities that have submitted an Action Plan and negotiated targets and milestones with Environment Canada for one or more substances on this list. To ensure a one-window approach to reporting, Environment Canada has incorporated the reporting requirements for ARET 2 into the NPRI reporting software.

Reporting under Environmental Performance Agreements

In June 2001, Environment Canada published the *Policy Framework for Environmental Performance Agreements.* Environmental Performance Agreements (EPAs) are non-legislative agreements, which meet core design criteria, and have been negotiated among parties to achieve specific environmental results. EPAs are voluntary initiatives that stem from Environment Canada's experience with Memoranda of Understanding. To ensure a one-window approach to reporting emissions information, Environment Canada has incorporated the reporting requirements for EPAs into the NPRI reporting software.

Reporting to the Ontario Ministry of the Environment

In May 2001, the Ontario Ministry of the Environment (ON MOE) issued the *Airborne Contaminant Discharge Monitoring and Reporting Regulation* (O.Reg.127/01) under the authority of the *Ontario Environmental Protection Act.* In response to requests from industry for a one-window approach to reporting to inventories, Environment Canada worked with the ON MOE to include the reporting form for O.Reg.127/01 within the NPRI reporting form. Refer to the *Guide for Reporting under O.Reg.127/01 Using the NPRI Software – 2002* for instructions on how to complete the reporting form for O.Reg.127/01. Reference material for reporting to the ON MOE is also provided on the 2002 NPRI reporting software CD.

Reporting to Alberta Environment

Beginning in 2002, the NPRI will collect emission information for Criteria Air Contaminants on behalf of Alberta Environment (AENV) to support its *Environmental Protection and Enhancement Act (EPEA)* approvals. A separate guidance document for reporting under the *EPEA* is available.

Reporting to the National Emissions Reduction Masterplan

The National Emissions Reduction Masterplan (NERM) is an emissions reporting and reduction initiative of the Canadian Chemical Producers' Association (CCPA). The 2002 NPRI reporting software will continue to collect emission information on behalf of NERM. For more information, see Step 3 of this Guide.

Reporting to the National Pollutant Release Inventory for 2002

Introduction

The NPRI changed significantly for the 2002 reporting year with the addition of Criteria Air Contaminants (CACs), the reduction of reporting thresholds for certain metals, and the addition of terminal operations and wastewater collection facilities to the list of activities exempt from the 20 000-hour employee threshold. As a result, in addition to this Guide, other guidance documents have been developed to assist facilities with 2002 NPRI reporting. These documents include guidance for the wastewater and wood preservation sectors and for CAC reporting.

This Guide provides a general overview of the reporting requirements for all NPRI substances. Detailed reporting guidance is provided within this Guide for the majority of NPRI substances, including core NPRI substances, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-*p*-dioxins (dioxins), polychlorinated dibenzofurans (furans), and hexachlorobenzene (HCB). Reporting criteria for these NPRI substances are explained in Step 1. Steps 2 through 5 explain what information must be reported to Environment Canada and how to complete the reporting form. Steps 6 and 7 explain how to submit an NPRI report to Environment Canada.

Facilities which met CAC or wastewater reporting criteria, or which fall within the wood preservation sector, are advised to consult the following companion documents – *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory, National Pollutant Release Inventory Guidance Manual for the Wastewater Sector* and *Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory.*

Regardless of the supplementary guides, this Guide should be consulted first by owners and operators of facilities to determine if they must report for any NPRI substances. Supplementary guides, if applicable, can be consulted following a facility's determination that it must report to Environment Canada for the 2002 NPRI.

The Legal Basis for the NPRI – Understanding the *Canada Gazette* Notice

The legal basis for the 2002 NPRI is the "Notice with Respect to Substances in the National Pollutant Release Inventory for 2002" published in the *Canada Gazette*, Part I, on December 29, 2001. The notice was published under the authority of subsection 46(1) of the *Canadian Environmental Protection Act, 1999* (CEPA 1999). This notice specifies that any person who owned or operated a facility during the calendar year 2002, under the conditions prescribed in the notice, must provide certain information to the Minister of the Environment by no later than **June 1, 2003**. An amendment to the *Canada Gazette* notice for the 2002 NPRI was published on December 28, 2002, to revise or clarify certain provisions for 2002. Notices are published annually in the *Canada Gazette*, Part I.

The *Canada Gazette* notice for the 2002 NPRI encompasses a wide range of substances, reporting criteria and requirements. It is divided into four schedules with several parts in each, as outlined below. The contents of the notice and its amendment are explained in this Guide. If you have any difficulties interpreting the requirements of the NPRI notice, contact your regional NPRI office listed inside the front cover of this Guide.

OVERVIEW OF THE *CANADA GAZETTE* NOTICE FOR THE 2002 NPRI

SCHEDULE 1 – NATIONAL POLLUTANT RELEASE INVENTORY SUBSTANCES

Schedule 1 lists all substances in the NPRI, and is broken into four parts according to the reporting criteria for the substances:

- Part 1 lists the 247 substances with a manufacture, process or other use threshold and is divided into four groups according to the threshold quantity
- Part 2 lists 17 individual PAHs
- Part 3 lists dioxins/furans and HCB
- Part 4 lists the seven CACs

SCHEDULE 2 – CRITERIA FOR REPORTING

General - reporting deadline, activities to which the 20 000-hour employee threshold does not apply, exclusions and exemptions

- Part 1 - reporting criteria for substances listed in Schedule 1, Part 1
- Part 2 - reporting criteria for the 17 PAHs listed in Schedule 1, Part 2
- Part 3 - reporting criteria for dioxins/furans and HCB listed in Schedule 1, Part 3
- Part 4 - reporting criteria for CACs listed in Schedule 1, Part 4

SCHEDULE 3 – TYPES OF INFORMATION SUBJECT TO NOTICE AND MANNER OF REPORTING

Schedule 3 outlines the information that must be submitted by facilities which met the reporting criteria defined in Schedule 2:

- Part 1 - facility information to be reported
- Part 2 - substance information to be reported for substances listed in Schedule 1, Parts 1 through 3
- Part 3 - substance information to be reported for CACs listed in Schedule 1, Part 4

SCHEDULE 4 – DEFINITIONS

Schedule 4 provides definitions of several terms used in the notice.

For the purpose of simplifying this reporting Guide:

- **Schedule 1, Part 1, Group 1 substances will be hereafter collectively referred to as Part 1A substances**
- **Schedule 1, Part 1, Groups 2-4 substances as Part 1B substances**
- **Schedule 1, Part 2 substances as Part 2 substances**
- **Schedule 1, Part 3 substances as Part 3 substances, and**
- **Schedule 1, Part 4 substances as Part 4 substances.**

TABLE 1: OVERVIEW OF SUBSTANCES AND THRESHOLDS FOR REPORTING TO THE 2002 NPRI

PART NO.	SUBSTANCE	MASS THRESHOLD	CONCENTRATION THRESHOLD	UNITS FOR REPORTING
Threshold based on quantity manufactured, processed, otherwise used				
1A	241 core substances	10 tonnes	1%	tonnes
1B	Mercury[1]	5 kg	n/a	kg
	Cadmium[1]	5 kg	0.1%	kg
	Arsenic[1], hexavalent chromium compounds, lead[2], tetraethyl lead	50 kg	0.1%	kg
Polycyclic aromatic hydrocarbons (PAHs) - Threshold based on special criteria				
2	17 individual PAHs	incidental manufacture and release or transfer of 50 kg total, or any quantity for wood preservation using creosote	n/a	kg
Dioxins/furans and Hexachlorobenzene (HCB) - No threshold, obligatory reporting for facilities used for or engaged in specific activities				
3	Dioxins/furans and HCB	activity-based	n/a	g TEQ[3], g
Criteria Air Contaminants (CACs) - Threshold based on quantity-released to air				
4	carbon monoxide, oxides of nitrogen, sulphur dioxide, total particulate matter	20 tonnes	n/a	tonnes
	volatile organic compounds	10 tonnes	n/a	tonnes
	PM_{10}	0.5 tonnes	n/a	tonnes
	$PM_{2.5}$	0.3 tonnes	n/a	tonnes

n/a not applicable
[1] and its compounds
[2] and its compounds, except tetraethyl lead (CAS No. 78-00-2); does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys
[3] See Step 2, Part 3 Substances, for explanation of these units

Step 1 – Determine whether a report is required for your facility

The first step is to determine whether your facility is required to report to the NPRI for any substances. This section outlines the reporting criteria for all substances listed in the NPRI for 2002. If you are required to report, refer to Step 2 for details on where to find guidance and information on how to estimate releases and transfers of the substances listed in the NPRI, and Steps 3 through 5 for a detailed description on how to use the 2002 NPRI reporting software.

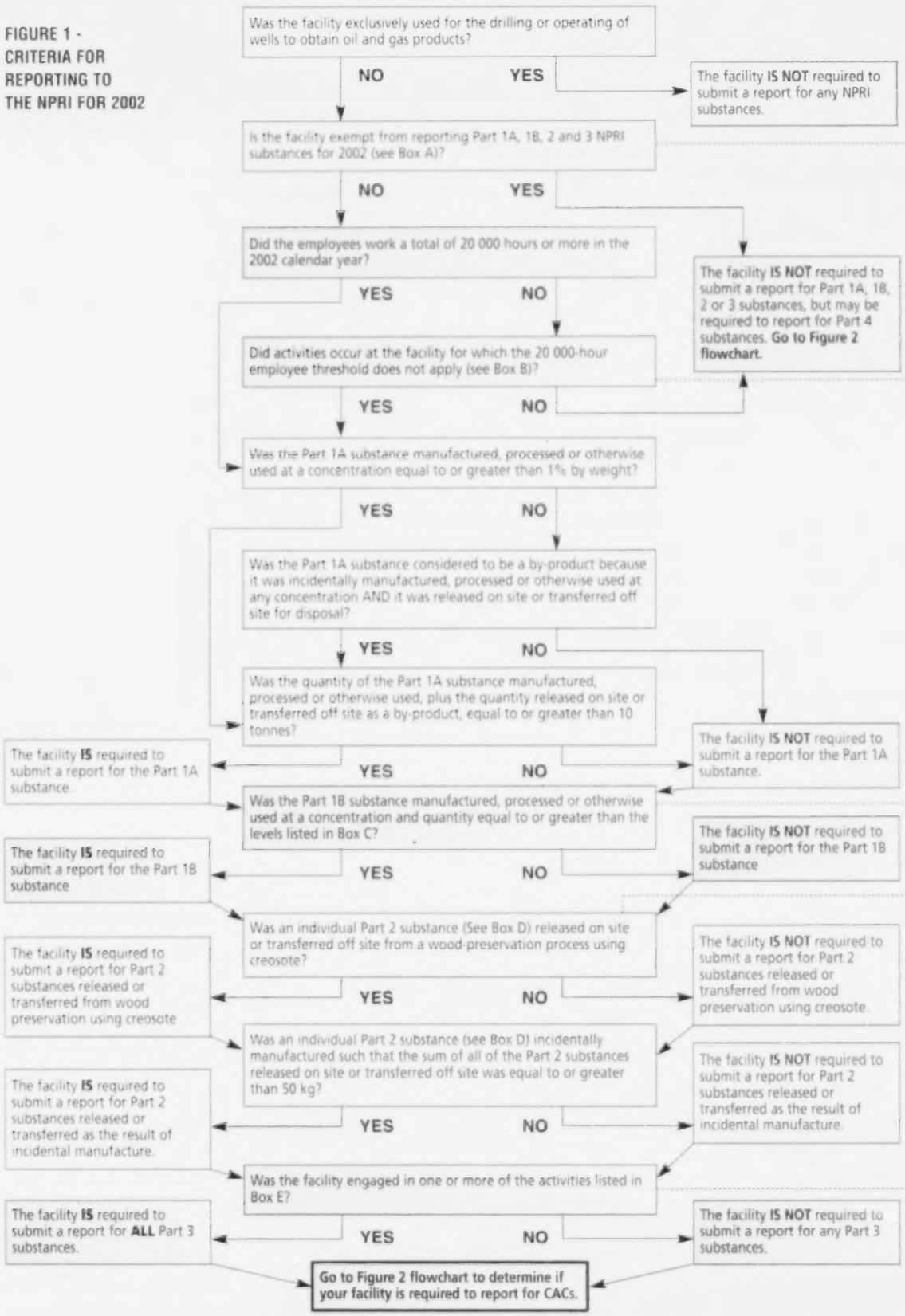
Overview of Reporting Criteria

The substances listed in the 2002 NPRI are divided into four groups, according to their differing sets of reporting criteria. The complete list of NPRI substances is provided in Appendix 1, and is subdivided into these four parts.

It is the facility's obligation to review the NPRI reporting criteria and requirements annually as they are subject to change.

Figure 1 provides an overview of the reporting criteria for the 2002 NPRI. Detailed explanations of the reporting criteria and requirements for each group of substances follow the figure.

FIGURE 1 - CRITERIA FOR REPORTING TO THE NPRI FOR 2002


Was the facility exclusively used for the drilling or operating of wells to obtain oil and gas products?
NO
YES
The facility IS NOT required to submit a report for any NPRI substances.
Is the facility exempt from reporting Part 1A, 1B, 2 and 3 NPRI substances for 2002 (see Box A)?
NO
YES
Did the employees work a total of 20 000 hours or more in the 2002 calendar year?
YES
NO
The facility IS NOT required to submit a report for Part 1A, 1B, 2 or 3 substances, but may be required to report for Part 4 substances. Go to Figure 2 flowchart.
Did activities occur at the facility for which the 20 000-hour employee threshold does not apply (see Box B)?
YES
NO
Was the Part 1A substance manufactured, processed or otherwise used at a concentration equal to or greater than 1% by weight?
YES
NO
Was the Part 1A substance considered to be a by-product because it was incidentally manufactured, processed or otherwise used at any concentration AND it was released on site or transferred off site for disposal?
YES
NO
Was the quantity of the Part 1A substance manufactured, processed or otherwise used, plus the quantity released on site or transferred off site as a by-product, equal to or greater than 10 tonnes?
The facility IS NOT required to submit a report for the Part 1A substance.
YES
NO
The facility IS required to submit a report for the Part 1A substance.
Was the Part 1B substance manufactured, processed or otherwise used at a concentration and quantity equal to or greater than the levels listed in Box C?
The facility IS NOT required to submit a report for the Part 1B substance
YES
NO
The facility IS required to submit a report for the Part 1B substance
Was an individual Part 2 substance (See Box D) released on site or transferred off site from a wood-preservation process using creosote?
The facility IS NOT required to submit a report for Part 2 substances released or transferred from wood preservation using creosote.
YES
NO
The facility IS required to submit a report for Part 2 substances released or transferred from wood preservation using creosote
Was an individual Part 2 substance (see Box D) incidentally manufactured such that the sum of all of the Part 2 substances released on site or transferred off site was equal to or greater than 50 kg?
The facility IS NOT required to submit a report for Part 2 substances released or transferred as the result of incidental manufacture.
YES
NO
The facility IS required to submit a report for Part 2 substances released or transferred as the result of incidental manufacture.
Was the facility engaged in one or more of the activities listed in Box E?
The facility IS NOT required to submit a report for any Part 3 substances.
YES
NO
The facility IS required to submit a report for ALL Part 3 substances.
Go to Figure 2 flowchart to determine if your facility is required to report for CACs.

Box A

A facility is exempt from reporting a substance listed in Parts 1A through 3 if the only source or use of that NPRI substance at the facility is from one or more of the activities listed below:

- educating or training students, such as at universities, colleges and schools
- research or testing
- maintaining and repairing transportation vehicles, such as automobiles, trucks, locomotives, ships or aircraft, **except** painting and stripping of vehicles and their components, or the rebuilding or remanufacturing of vehicle components
- distribution, storage or retail sale of fuels, **except** as part of the terminal operations
- wholesale or retail sale of articles or products, if the substance is not released to the environment during normal use at the facility
- retail sale of the substance
- growing, harvesting or managing renewable natural resources, such as fisheries, forestry or agriculture, **but not** the processing or other use of renewable natural resources
- mining, **but not** the further processing or other use of mined materials
- the practice of dentistry.

Box B

Was the facility used for any of the following activities to which the 20 000-hour employee threshold does not apply?

- non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
- biomedical or hospital waste incineration of 26 tonnes or more of waste per year
- hazardous waste incineration
- sewage sludge incineration
- wood preservation
- terminal operations
- discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m^3/day or more, into surface waters.

Box C

Part 1B substances - specific metals and their compounds, and organometals at reduced thresholds:

Substance	Mass Threshold	Concentration Threshold
• Mercury (and its compounds)	5 kg	n/a
• Cadmium (and its compounds)	5 kg	0.1 %
• Arsenic (and its compounds)	50 kg	0.1 %
• Hexavalent chromium compounds	50 kg	0.1 %
• Lead (and its compounds)	50 kg	0.1 %
• Tetraethyl lead (CAS No. 78-00-2)	50 kg	0.1 %

Box D

Part 2 substances - 17 individual PAHs:

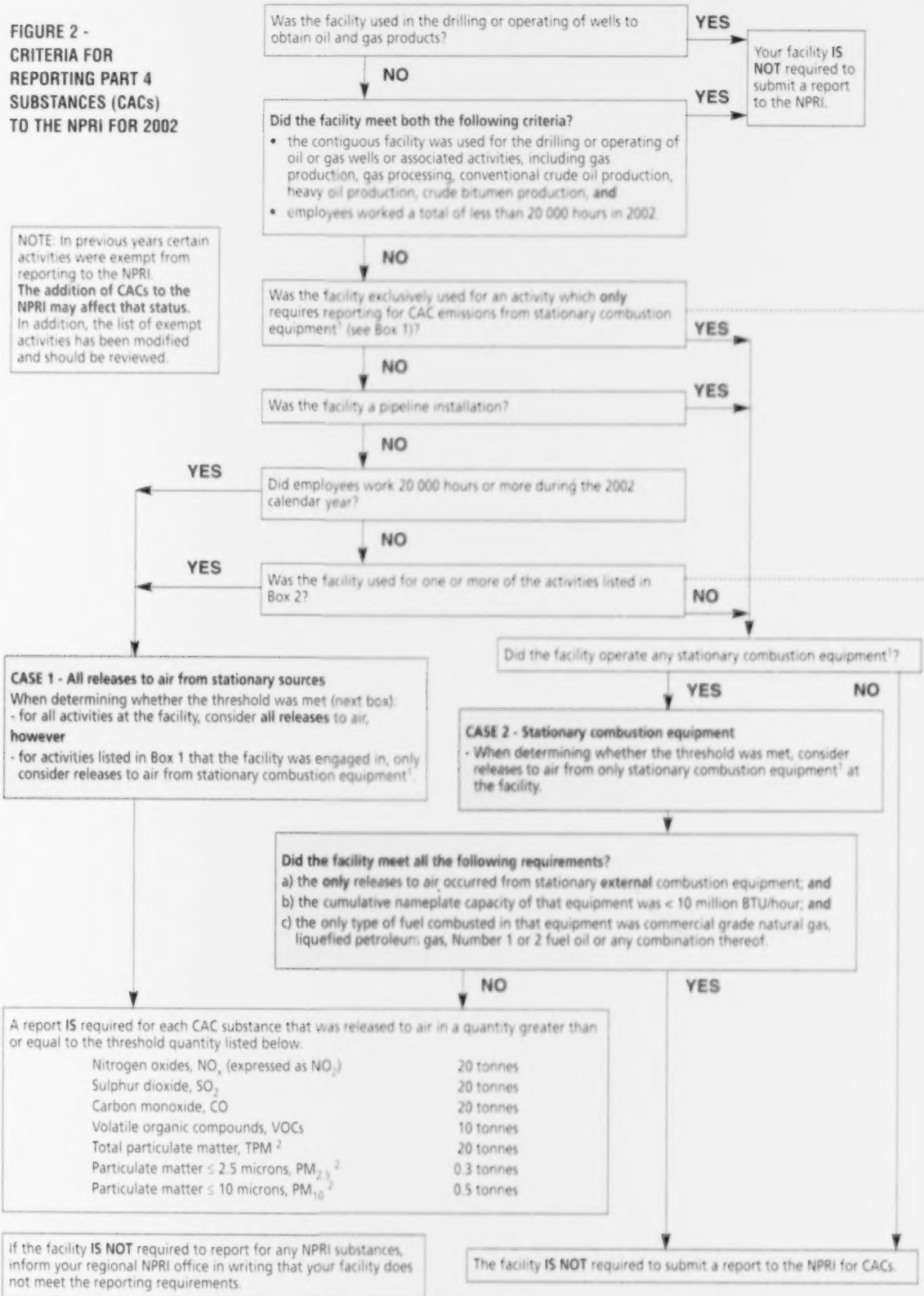
• Benzo(a)anthracene	(CAS No. 56-55-3)	• Dibenzo(a,h)anthracene	(53-70-3)
• Benzo(a)phenanthrene	(218-01-9)	• Dibenzo(a,i)pyrene	(189-55-9)
• Benzo(a)pyrene	(50-32-8)	• 7H-Dibenzo(c,g)carbazole	(194-59-2)
• Benzo(b)fluoranthene	(205-99-2)	• Fluoranthene	(206-44-0)
• Benzo(e)pyrene	(192-97-2)	• Indeno(1,2,3-c,d)pyrene	(193-39-5)
• Benzo(g,h,i)perylene	(191-24-2)	• Perylene	(198-55-0)
• Benzo(j)fluoranthene	(205-82-3)	• Phenanthrene	(85-01-8)
• Benzo(k)fluoranthene	(207-08-9)	• Pyrene	(129-00-0)
• Dibenz(a,j)acridine	(224-42-0)		

Box E

Was the facility engaged in one or more of the following activities?

- non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
- biomedical or hospital waste incineration of 26 tonnes or more of waste per year
- hazardous waste incineration
- sewage sludge incineration
- base metals smelting (copper, lead, nickel and zinc)
- smelting of secondary aluminum
- smelting of secondary lead
- manufacturing of iron using a sintering process
- operation of electric arc furnaces in steel foundries
- operation of electric arc furnaces in steel manufacturing
- production of magnesium
- manufacturing of portland cement
- production of chlorinated organic solvents or chlorinated monomers
- combustion of fossil fuel in a boiler unit with a nameplate capacity of 25 megawatts or greater of electricity, for the purpose of producing steam for the production of electricity
- combustion of hog fuel originating from logs that were transported or stored in salt water in the pulp and paper sector,
- combustion of fuel in kraft liquor boilers used in the pulp and paper sector
- wood preservation using pentachlorophenol.

FIGURE 2 - CRITERIA FOR REPORTING PART 4 SUBSTANCES (CACs) TO THE NPRI FOR 2002


Was the facility used in the drilling or operating of wells to obtain oil and gas products?
YES
Your facility IS NOT required to submit a report to the NPRI.
NO
Did the facility meet both the following criteria?
• the contiguous facility was used for the drilling or operating of oil or gas wells or associated activities, including gas production, gas processing, conventional crude oil production, heavy oil production, crude bitumen production, and
• employees worked a total of less than 20 000 hours in 2002.
YES
NOTE: In previous years certain activities were exempt from reporting to the NPRI. The addition of CACs to the NPRI may affect that status. In addition, the list of exempt activities has been modified and should be reviewed.
NO
Was the facility exclusively used for an activity which only requires reporting for CAC emissions from stationary combustion equipment[1] (see Box 1)?
YES
NO
Was the facility a pipeline installation?
YES
NO
Did employees work 20 000 hours or more during the 2002 calendar year?
YES
NO
Was the facility used for one or more of the activities listed in Box 2?
YES
NO
CASE 1 - All releases to air from stationary sources
When determining whether the threshold was met (next box):
- for all activities at the facility, consider all releases to air,
however
- for activities listed in Box 1 that the facility was engaged in, only consider releases to air from stationary combustion equipment[1].
Did the facility operate any stationary combustion equipment[1]?
YES
NO
CASE 2 - Stationary combustion equipment
- When determining whether the threshold was met, consider releases to air from only stationary combustion equipment[1] at the facility.
Did the facility meet all the following requirements?
a) the only releases to air occurred from stationary external combustion equipment; and
b) the cumulative nameplate capacity of that equipment was < 10 million BTU/hour; and
c) the only type of fuel combusted in that equipment was commercial grade natural gas, liquefied petroleum gas, Number 1 or 2 fuel oil or any combination thereof.
NO
YES
A report IS required for each CAC substance that was released to air in a quantity greater than or equal to the threshold quantity listed below.
Nitrogen oxides, NO_x (expressed as NO_2) 20 tonnes
Sulphur dioxide, SO_2 20 tonnes
Carbon monoxide, CO 20 tonnes
Volatile organic compounds, VOCs 10 tonnes
Total particulate matter, TPM [2] 20 tonnes
Particulate matter ≤ 2.5 microns, $PM_{2.5}$ [2] 0.3 tonnes
Particulate matter ≤ 10 microns, PM_{10} [2] 0.5 tonnes
If the facility IS NOT required to report for any NPRI substances, inform your regional NPRI office in writing that your facility does not meet the reporting requirements.
The facility IS NOT required to submit a report to the NPRI for CACs.

[1] Stationary combustion equipment includes both external and internal combustion equipment.
[2] Do not consider releases from road dust.

Box 1

Activities Where Only CAC Emissions from Stationary Combustion Equipment are Considered:

- education or training of students, such as at universities, colleges and schools
- research or testing
- maintaining and repairing of transportation vehicles, such as automobiles, trucks, locomotives, ships or aircraft, **except** painting and stripping of vehicles or their components, or the rebuilding or remanufacturing of vehicle components
- distribution, storage or retail sale of fuels, **except** as part of the terminal operations
- wholesale or retail sale of articles or products, if the substance is not released to the environment during normal use at the facility
- retail sale of the substance
- growing, harvesting or managing renewable natural resources, such as fisheries, forestry or agriculture, **but not** the processing or other use of renewable natural resources
- mining, **but not** the further processing or other use of mined materials
- the practice of dentistry

Box 2

- non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
- biomedical or hospital waste incineration of 26 tonnes or more of waste per year
- hazardous waste incineration
- sewage sludge incineration
- wood preservation
- terminal operations
- discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m^3/day or more, into surface waters.

Facility Criteria

In previous years, there was only one definition of a facility. With the addition of CACs to the NPRI, a second definition was required to capture reporting from another type of facility. As such, the original definition of facility was renamed to "contiguous facility", and a "pipeline installation" is a new type of facility now subject to reporting to the NPRI, specifically for CACs. In the *Canada Gazette* notice, the term "facility" is used in a broader context to refer to both "contiguous facilities" and "pipeline installations". Definitions are provided below.

Contiguous Facility (formerly "facility")

A *contiguous facility* (formerly "facility") means all buildings, equipment, structures and stationary items that are located on a single site or on contiguous or adjacent sites and that are owned or operated by the same person and that function as a single integrated site and also includes wastewater collection systems that discharge treated or untreated wastewater into surface waters.

Pipeline Installation

Pipeline installations are important sources of CAC emissions, but did not fall under the traditional NPRI definition of a contiguous facility (formerly "facility"). As such, a new definition was included to require reporting of CAC emissions from these types of facilities.

A *pipeline installation* is defined as a collection of equipment situated at a single site, used in the operation of a natural gas transmission or distribution pipeline. Pipeline installations are subject **only** to the reporting criteria for CACs and not other NPRI substances.

Pipeline installations are spaced approximately 80-160 kilometres (50-100 miles) apart along a pipeline from a gas supply area to the market area. This definition includes pipeline compressor and storage stations along pipelines used to transport natural gas.

Exempt Facilities

A facility expressly used in the drilling or operating of wells for the purpose of obtaining oil and gas products is exempt from reporting to the NPRI. In addition, a facility used for an activity associated with the drilling or operation of oil and gas wells, including gas production, gas processing, conventional crude oil production, heavy oil production, or crude bitumen production, **and** whose employees worked less than 20 000 hours is not required to report to the NPRI. These are the only facilities exempt from reporting releases and transfers of all NPRI substances.

Facilities Exempt from Reporting Parts 1A through 3 Substances

A facility is exempt from reporting Parts 1A through 3 substances to the NPRI if the **only source or use** of that NPRI substance at the facility was from one or more of the activities listed in Table 2. In cases where a facility met the reporting criteria for a substance based on sources **other than** those listed in Table 2, it should not include the quantity of that same substance from any exempt activities (listed in Table 2) when reporting release or transfer quantities to the NPRI.

TABLE 2: ACTIVITIES NOT CONSIDERED WHEN REPORTING PARTS 1A THROUGH 3 SUBSTANCES TO THE NPRI

- educating or training students, such as at universities, colleges and schools
- research or testing
- maintaining and repairing transportation vehicles, such as automobiles, trucks, locomotives, ships or aircraft, **except** painting and stripping of vehicles or their components, or rebuilding or remanufacturing of vehicle components
- distribution, storage or retail sale of fuels, **except** as part of terminal operations
- wholesale or retail sale of articles or products which contain NPRI substances, if the substance is not released to the environment during normal use at the facility
- the retail sale of NPRI substances
- growing, harvesting or managing renewable natural resources, such as fisheries, forestry or agriculture, **but not** the processing or other use of renewable natural resources
- mining, **but not** the further processing or other use of mined materials
- the practice of dentistry

Activities in Table 2 are not exempt from reporting for Part 4 substances (CACs). For more information on CAC reporting with respect to the above activities, see the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory.*

The exemption for the maintenance and repair of transportation vehicles was modified in 2002 to make a distinction between activities associated with maintaining/repairing and activities related to painting/rebuilding of transportation vehicles, vessels and aircraft. Substances used for activities involving routine, scheduled and preventative maintenance continue to be exempt (e.g., repair, cleaning, replacement of lubricants/fluids). However, substances used in the painting or stripping of vehicles or vehicle components now are subject to reporting. Additionally, there is no exemption for activities that involve the removal, breakdown and total reconstruction of vehicle components (e.g., engines, landing gear, traction motors) using recovered or new parts, such that the rebuilt component is reinstalled or sold as an 'as new' replacement.

The distribution, storage or sale of fuels exemption was also revised in 2002 to exclude terminal operations. Terminal operations are important sources of volatile organic compounds (VOCs). To capture reporting from these sources, the 20 000-hour employee threshold had to be removed, since these facilities often employ few workers.

Exclusions

A facility should not include the quantity of a substance from any sources listed in Table 3 when calculating the reporting thresholds or when reporting release or transfer quantities to the NPRI.

TABLE 3: SOURCES NOT CONSIDERED WHEN REPORTING TO THE NPRI

- **articles that are processed or otherwise used***
- **materials used as structural components of the facility** – The exclusion of structural components of the facility from the reporting threshold is limited to buildings and other fixed structures but does not include process equipment.
- **materials used in routine janitorial or facility grounds maintenance** – This includes NPRI substances contained in fertilizers and pesticides used for grounds maintenance and cleaning agents, floor waxes, etc., used for maintaining facility cleanliness. The maintenance of processing equipment is not considered "routine janitorial" or "facility grounds" maintenance. For example, if manufacturing or processing equipment is cleaned with a solvent, the amount of the NPRI substance(s) contained in the solvent should be included in the threshold calculation.
- **materials used for personal use by employees or other persons**
- **materials used for the purpose of maintaining motor vehicles operated by the facility**
- **in intake water or intake air** – This refers to water used for process cooling or air used either as compressed air or for combustion.

* See Reporting Criteria for Part 1A Substances for explanation of "article".

Employee Criteria

Before determining whether the facility met the substance-specific threshold for any substances listed in the NPRI, the facility must determine if it met the employee criteria. A facility is not required to report Part 1A, 1B, 2 or 3 substances to the NPRI if, during the 2002 calendar year:

- the total number of hours worked by all employees was less than 20 000 hours, **and**
- the facility **was not** used mainly or exclusively for any of the activities in Table 4.

The 20 000-hour employee threshold and activities to which the employee threshold does not apply are further explained below.

20 000-hour Employee Threshold

This threshold depends specifically on the number of hours worked by all employees at the facility during the calendar year and not on the number of persons working. To determine if your facility met the 20 000-hour employee threshold, include all hours worked by:

- persons employed at the facility, including students, part-time and term employees
- owner(s) who performed work on site at the facility, and
- persons who performed work on site at the facility on a routine basis related to the normal operation of the facility, for the period of time the person performed that work, such as contractors.

The total number of hours worked includes paid vacation and sick leave.

Activities to Which the 20 000-hour Employee Threshold Does Not Apply

If your facility was used mainly or exclusively for one or more of the activities listed in Table 4, you must submit a report for any NPRI substance that met its respective reporting criteria, regardless of the number of hours worked by employees. The employee threshold does not apply because facilities used for these activities are known to release significant quantities of NPRI pollutants to the environment, but often were not required to report to the NPRI since they did not meet the 20 000-hour employee threshold.

Complete descriptions of these activities are provided below.

TABLE 4: ACTIVITIES TO WHICH THE 20 000-HOUR EMPLOYEE THRESHOLD DOES NOT APPLY

Waste Incineration Activities

(a) non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners

(b) biomedical or hospital waste incineration of 26 tonnes or more of waste per year

(c) hazardous waste incineration

(d) sewage sludge incineration

Wood-Preservation Activities

(e) wood preservation (using heat or pressure treatment, or both)

Terminal Operation Activities

(f) terminal operations related to fuels

Wastewater Systems

(g) wastewater collection systems discharging 10 000 m^3 or more per day, into surface waters

Waste-Incineration Activities

The first four activities listed in Table 4 are forms of waste incineration. ***Waste incineration***, for the purposes of the NPRI, only includes incineration that takes place in a waste incinerator. Waste incineration does not include open burning of wastes.

A ***waste incinerator*** is a device, mechanism or structure constructed primarily to thermally treat (e.g., combust or pyrolyze) a waste for the purpose of reducing its volume, destroying a hazardous chemical present in the waste, or destroying pathogens present in the waste. This includes facilities where waste heat is recovered as a by-product from the exhaust gases from an incinerator (e.g., energy-from-waste incinerators). This also includes conical burners and beehive burners. This does not include industrial processes where fuel derived from waste is fired as an energy source, such as industrial boilers. For example, if bark, wood chips or other wood waste is used as fuel to fire a boiler, these activities are not considered energy-from-waste incinerators.

To maintain consistency with Canada-wide Standards for Dioxins and Furans, in 2002, the throughput for non-hazardous and biomedical/hospital waste incinerators was reduced from 100 tonnes to 26 tonnes/year.

a) ***Non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners***

Non-hazardous solid waste means any waste, regardless of origin, which might normally be disposed of in a non-secure manner, such as at a sanitary landfill site, if not incinerated. It includes clean wood waste, i.e., waste from woodworking or forest product operations, including bark, where the wood waste has not been treated with preservative chemicals (e.g., pentachlorophenol) or decorative coatings. Non-hazardous solid waste incineration includes incineration of residential and other municipal wastes in conical burners, and clean wood waste in beehive burners.

A facility used for the incineration of 26 tonnes or more of non-hazardous solid waste per year is required to report to the NPRI if it met the substance criteria, regardless of the number of hours worked by employees.

b) ***Biomedical or hospital waste incineration of 26 tonnes or more of waste per year***

Biomedical waste is fully defined in Appendix 4. Biomedical or hospital waste refers to waste that is generated by:

- human or animal health-care facilities
- medical or veterinary research and testing establishments
- health-care teaching establishments
- clinical testing or research laboratories, and
- facilities involved in the production or testing of vaccines.

Biomedical or hospital waste includes human anatomical waste and animal waste. It also includes microbiology laboratory waste, human blood and body fluid waste, and waste sharps that have not been disinfected or decontaminated. It does not include waste from animal husbandry, or waste that is controlled in accordance with the *Health of Animals Act* (Canada).

Wastes that are household in origin, or that are generated in the food production, general building maintenance and office administration activities of those facilities to which this definition applies, are not considered to be biomedical or hospital waste but rather to be non-hazardous solid waste.

A facility used for biomedical or hospital waste incineration of 26 tonnes or more of waste per year is required to report to the NPRI if it met the substance criteria, regardless of the number of hours worked by employees.

c) Hazardous waste incineration

Hazardous waste is fully defined in Appendix 5. Hazardous waste includes those wastes that are potentially hazardous to human health and/or the environment because of their nature and quantity, and that require special handling techniques. Hazardous waste incinerators must be licensed or authorized by the responsible jurisdiction. Hazardous waste incinerated in a mobile incinerator temporarily located at your facility must be included as part of this activity.

A facility used for the incineration of hazardous waste is required to report to the NPRI if it met the substance criteria, regardless of the number of hours worked by employees or the quantities incinerated.

d) Sewage sludge incineration

Sludge means a semi-liquid mass removed from a liquid flow of wastes. Sewage sludge means sludge from a facility treating wastewater from a sanitary sewer system. The drying of sludge to reduce water content is part of the incineration stage.

A facility used for the incineration of sewage sludge is required to report to the NPRI if it met the substance criteria, regardless of the number of hours worked by employees or the quantities incinerated.

Wood-Preservation Activities

e) Wood Preservation (using heat or pressure treatment, or both)

Wood preservation means the use of a preservative for the preservation of wood by means of heat or pressure treatment, or both, and includes the manufacture, blending or reformulation of wood preservatives for that purpose.

A facility used for wood preservation is required to report to the NPRI for Part 1A and 1B substances if it met the substance criteria, regardless of the number of hours worked by employees.

Wood Preservation Using Creosote

A facility used for wood preservation must report for any of the 17 individual PAHs released on site or transferred off site from a wood-preservation process using creosote, regardless of the number of hours worked by employees.

Wood Preservation Using Pentachlorophenol

A facility used for wood preservation using pentachlorophenol must report for dioxins/furans and HCB, regardless of the number of hours worked by employees or the quantities of dioxins/furans and HCB released or transferred.

For more detailed information regarding wood preservation and NPRI reporting, operators of wood-preservation facilities can consult the document, *Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory* (Environment Canada, 2003). This technical guide is available on the NPRI reporting software CD and the NPRI Web site <www.ec.gc.ca/pdb/npri/>.

Terminal Operation Activities

f) ***Terminal operations related to fuel***

Terminal operations are sources of some NPRI pollutants, including Volatile Organic Compounds (VOCs). To capture reporting from these sources, the 20 000-hour criterion was removed because, in many cases, the total hours worked at terminal operations is less than 20 000 hours.

For the purposes of reporting, terminal operations refer to either i) the use of storage tanks and associated equipment at a site used to store or transfer crude oil, artificial crude or intermediates of fuel products into or out of a pipeline, or ii) the operating activities of a primary distribution installation normally equipped with floating roof tanks that receives gasoline by pipeline, railcar, marine vessel or directly from a refinery. The definition of terminal operations does not include bulk plants or service stations.

A facility used for terminal operations is required to report to the NPRI if it met any substance criteria, regardless of the number of hours worked by employees.

Wastewater Systems

g) ***Wastewater collection systems discharging 10 000 m^3 or more per day, into surface waters***

A wastewater facility is defined for NPRI as wastewater collection systems that discharge treated or untreated wastewater into surface waters with an annual average flow rate of 10 000 cubic metres or more per day. Therefore, a wastewater system for NPRI reporting purposes includes both the *treatment and collection* components.

A *Wastewater Collection System* is the system of sewers and/or ditches that convey sanitary or combined sewage for a community. The volume of sewage released to surface waters from the collection system must be included in the calculation of annual average discharge per day from the wastewater facility. Potential effluent volumes of importance to include in the calculation of the annual average discharge per day from the collection system include:

- direct discharge of sewage from a main outfall where no treatment exists
- sanitary sewer system overflows
- combined sewer system overflows
- pumping station overflows, and
- bypass flows (for repair and maintenance activities or for emergency response activities).

A collection system includes adjacent service areas or adjoining sewage sheds that function as a single integrated system for a community. Discharges to the environment from all components of the system must be considered when determining whether your facility met the flow threshold and substance reporting criteria. Where no treatment facilities exist, the wastewater facility consists of the entire collection system, and may require NPRI reporting if it met the basic reporting requirements.

Communities whose collection systems discharge into another community's collection system do not have to report to the NPRI. Reporting may be required by the receiving community if it met the basic reporting requirements.

A *Wastewater Treatment System* means a plant or process location that accepts collection system flows of a community for the purposes of removing substances from the wastewater. The volume of both treated and untreated sewage released from the wastewater treatment system must be included in the calculation of annual average discharge per day from the wastewater facility. Potential effluent volumes of importance to include in the calculation of the annual average discharge per day from the wastewater treatment system include:

- process flow
- sludge treatment discharges (biosolids/sludges)
- backwash and filter discharges released to surface waters (i.e., not including process waste recycled back into the wastewater treatment system)

- tank drainage released to surface waters (i.e., not including process waste recycled back into the wastewater treatment system), and
- bypass flows released to surface waters (untreated or partially treated) for repair and maintenance activities, or from hydraulic overloads.

A wastewater collection system that had an annual average discharge of greater than or equal to 10 000 m^3/day of untreated or treated water to surface water is required to report to the NPRI if it met any substance criteria, regardless of the number of hours worked by employees.

For more detailed information regarding the wastewater sector and NPRI reporting, operators of wastewater collection or treatment facilities can consult the following document: *National Pollutant Release Inventory Guidance Manual for the Wastewater Sector* (Environment Canada, 2003).

Reporting Criteria for Part 1A Substances

Overview

Part 1A lists substances of concern, most of which have been on the NPRI since its inception. These compounds are commonly referred to as the "core" substances and comprise the majority of the NPRI substance list.

Substances

Changes to the NPRI List of Substances for 2002, Part 1A, include:

- deletion of arsenic[1], cadmium[1], lead[2] and tetraethyl lead from Part 1A and their addition to Part 1B because of the reduction of their reporting thresholds
- change in qualifier for chromium from "and its compounds" to "and its compounds, except hexavalent chromium compounds".

You must confirm that one or more of the 241 substances listed in Part 1A were manufactured, processed or otherwise used at your facility. The NPRI substances are listed in alphabetical order in Appendix 1. Most of the substances have CAS numbers associated with them. The NPRI substances are listed by CAS number in Appendix 2. Substances that do not have a unique CAS number are noted with an asterisk (*).

Some groups of substances and individual substances are qualified in terms of their specific physical or chemical form, state or particle size. These qualifiers will determine whether your facility will be required to report for a given substance:

- **fume or dust**
  This qualifier for aluminum refers to solids with particle diameters of 0.001 to 1 micron for fumes and 1 to 100 microns for dust particles.
- **fibrous forms**
  This qualifier, applied to aluminum oxide, includes the form of aluminum oxide found in brake linings but excludes the more common granular, powdered or fumed forms of alumina.
- **salts**
  Weak acids and bases are listed with this qualifier. Although the CAS number that appears on the NPRI list is specific to the acid or base, all salts of these listed substances must be reported as an equivalent weight of the acid or base.

[1] and its compounds

[2] and its compounds, except tetraethyl lead (CAS No. 78-00-2); does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

- **compounds**
  Nine NPRI Part 1A elements have this qualifier – antimony, chromium, cobalt, copper, manganese, nickel, selenium, silver and zinc. The pure element and any substance, alloy or mixture must be reported as the equivalent weight of the element itself. No CAS number is provided for these substances. For example, a galvanizing facility that uses zinc chloride ($ZnCl_2$) should only consider the mass contribution of Zn by itself when determining whether it meets the reporting threshold for zinc and calculating releases and transfers of zinc.

  Note that chromium appears on the Part 1A list with the following qualifier "and its compounds, except for hexavalent chromium compounds". This is because special reporting criteria have been developed for hexavalent chromium compounds (see Reporting Criteria for Part 1B Substances). When calculating the mass threshold for chromium and its compounds, exclude the contribution from hexavalent chromium compounds in the calculation. Separate reports must be submitted for the Part 1A listing, "chromium (and its compounds)" and the Part 1B listing, "hexavalent chromium compounds".

- **(except when in an alloy) and its compounds**
  This qualifier applies only to vanadium. The pure element and any substance or mixture must be reported as the equivalent weight of the element. No CAS number is provided for these substances. Do not include vanadium contained in an alloy. An alloy includes metal products containing two or more elements as a solid solution, intermetallic compounds and/or mixtures of metallic phases.

  This change to the qualifier for vanadium was made in 2001 to capture all forms of vanadium and its compounds released from the combustion of fuel.

- **friable form**
  Asbestos is the general name for several fibrous minerals and products. Only asbestos that is brittle and readily crumbled should be reported.

- **mixed isomers**
  This qualifier is used for mixtures of isomers which have the same chemical formula but different chemical structures. The substances with this qualifier are dinitrotoluene, *n*-nonylphenol and toluenediisocyanate. Substances with this qualifier are usually found as mixtures. The total quantity of all isomers must be used in calculating the 10-tonne threshold quantity. Do not apply the 10-tonne reporting threshold to each individual isomer unless the pure isomer alone is manufactured, processed, otherwise used or is an NPRI by-product.

- **all isomers**
  This qualifier is applied to cresol, xylene and three hydrochlorofluorocarbons (HCFC-122, HCFC-123 and HCFC-124). Each of these substances should be reported as an aggregate of the individual isomers that have the same chemical formula but different chemical structures. The total quantity of all isomers must be used in calculating the 10-tonne threshold. Refer to Appendices 1 and 2.

- **ionic**
  This qualifier, applied to cyanides, includes the salts of hydrogen cyanide but excludes organocyanides, nitriles and organometallic cyanide compounds such as ferrocyanide. In the mining industry, ionic cyanide is equivalent to "weak acid dissociable" cyanide.

- **total**
  For aqueous solutions of ammonia, this means both NH_3 and NH_4^+ expressed as ammonia.

- **yellow or white**
  This qualifier is the general description for the common allotropes of elemental phosphorus.

- **in solution at a pH of 6.0 or greater**
  This distinguishes nitrate ion in neutral or basic solution from nitric acid (pH of less than 6.0). If nitric acid is neutralized to a pH of 6.0 or greater, you must submit a report for both "nitric acid" and for "nitrate ion in solution". Your release or transfer of nitric acid would be "zero" and your release or transfer of nitrate ion would reflect the quantity of neutralized nitric acid reported as nitrate ion in solution at a pH of 6.0 or greater.

In most cases, consider only the substances and the CAS numbers listed. For example, "styrene" is listed with its corresponding CAS number "100-42-5". The chemical description which corresponds to this CAS number does not include "polystyrene". There are no polymers on the NPRI list, only monomers.

Material Safety Data Sheets (MSDSs) are an important source of information on the composition of purchased products. Suppliers of hazardous materials are required, as part of the Workplace Hazardous Material Information System (WHMIS), to supply MSDSs on request.

Units

Report on-site releases and off-site transfers of NPRI Part 1A substances in tonnes.

Reporting Criteria

In general, any person who owns or operates a facility must submit a report to the NPRI for a Part 1A substance **only** if **all** of the following criteria are met:

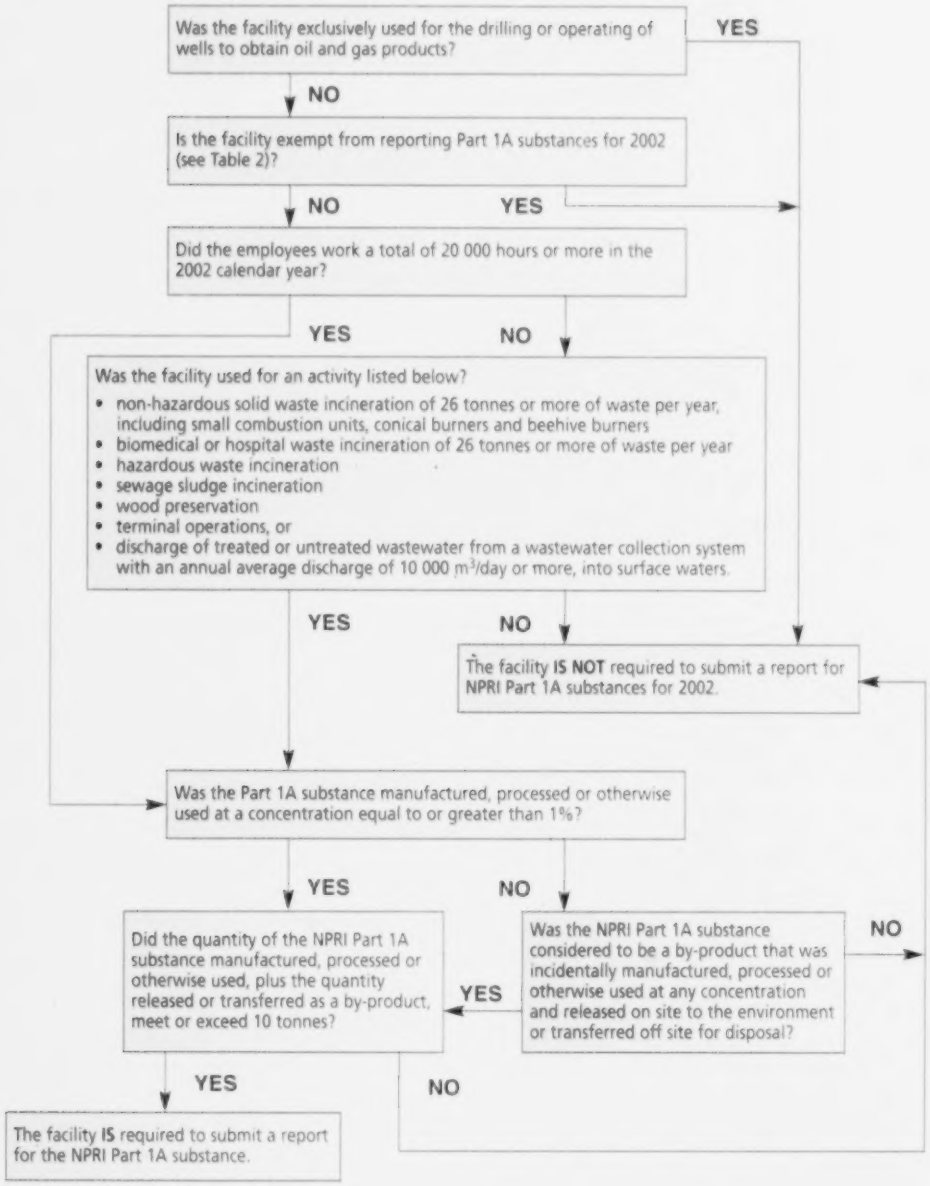
- employee criteria (see previous section)
- the facility manufactured, processed or otherwise used 10 tonnes (10 000 kg) or more of an NPRI Part 1A substance in the 2002 calendar year, and
- the NPRI Part 1A substance was manufactured, processed or otherwise used at a concentration greater than or equal to 1% by weight, with the exception of NPRI substances considered to be by-products. The total weight of by-products at any concentration must also be included in the calculation of the 10-tonne threshold for each NPRI Part 1A substance.

Figure 3 illustrates the steps to follow to determine if your facility is required to submit a report to the NPRI for a given NPRI Part 1A substance. A facility must meet **all the reporting criteria** before it is required to report on-site releases and transfers off site for disposal or recycling of the Part 1A substance.

Once you have determined that your facility is required to submit a report for an NPRI Part 1A substance, all on-site releases and all off-site transfers for disposal or recycling of that substance are reportable, regardless of their concentration or quantity (including "zero" releases and transfers).

For guidance on estimating releases and transfers, refer to Step 2 and Appendix 6.

FIGURE 3 – REPORTING CRITERIA FOR PART 1A SUBSTANCES


Was the facility exclusively used for the drilling or operating of wells to obtain oil and gas products?
YES
NO
Is the facility exempt from reporting Part 1A substances for 2002 (see Table 2)?
NO
YES
Did the employees work a total of 20 000 hours or more in the 2002 calendar year?
YES
NO
Was the facility used for an activity listed below?
• non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
• biomedical or hospital waste incineration of 26 tonnes or more of waste per year
• hazardous waste incineration
• sewage sludge incineration
• wood preservation
• terminal operations, or
• discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m3/day or more, into surface waters.
YES
NO
The facility IS NOT required to submit a report for NPRI Part 1A substances for 2002.
Was the Part 1A substance manufactured, processed or otherwise used at a concentration equal to or greater than 1%?
YES
NO
Did the quantity of the NPRI Part 1A substance manufactured, processed or otherwise used, plus the quantity released or transferred as a by-product, meet or exceed 10 tonnes?
YES
Was the NPRI Part 1A substance considered to be a by-product that was incidentally manufactured, processed or otherwise used at any concentration and released on site to the environment or transferred off site for disposal?
NO
YES
NO
The facility IS required to submit a report for the NPRI Part 1A substance.

Nature of Activities

The terms "manufacture", "process" and "other use" are defined below. These activities are part of the reporting criteria. An NPRI Part 1A substance at a concentration equal to or greater than 1% or an NPRI Part 1A by-product at any concentration are included in the calculation of the 10-tonne reporting threshold if they had been manufactured, processed or otherwise used. An NPRI report does not have to be submitted for a substance that was never manufactured, processed or otherwise used at the facility during the reporting year.

Manufacture

The term "manufacture" means to produce, prepare or compound an NPRI substance. It also includes the coincidental production of an NPRI substance as a "by-product" resulting from the manufacture, processing or other use of other substances.

The production of chlorine dioxide by a chemical plant is an example of manufacturing. The production of hydrochloric acid during the manufacture of chlorofluorocarbons is an example of incidental production.

Process

The term "process" means the preparation of an NPRI substance, after its manufacture, for distribution in commerce. Processing includes preparation of a substance with or without changes in physical state or chemical form. The term also applies to the processing of a mixture or formulation that contains an NPRI substance as one component, as well as the processing of "articles" (see below).

The use of chlorine (an NPRI substance) to manufacture hypochloric acid (not an NPRI substance) is an example of processing of chlorine. The use of toluene and xylenes to blend paint solvent mixtures is an example of processing without changes in chemical form.

Other Use

The terms "other use" and "otherwise used" encompass any use *or disposal* of an NPRI substance at a facility that does not fall under the definitions of "manufacture" or "process". This includes the use of the substance as a chemical processing aid, manufacturing aid or some other ancillary use. The use of trichloroethylene in the maintenance of manufacturing and process equipment is considered an "other use". "Other use" does not include routine janitorial or facility grounds maintenance.

By-products

A "by-product" is an NPRI substance that is incidentally manufactured, processed or otherwise used at the facility at any concentration by weight, and is released on site to the environment or transferred off site for disposal.

By-products are included in the calculation of the 10-tonne reporting threshold for Part 1A substances to capture large-volume, low-concentration releases and transfers. By-product reporting affects facilities that release to the environment or transfer for disposal large quantities of NPRI Part 1A substances at very low concentrations. By-products are not included in the calculation of reporting thresholds for NPRI Part 1B, 2, 3 or 4 substances. Some examples of affected sectors include, but are not limited to, power generation, aluminum smelting, and pulp and paper production.

Normally, only NPRI Part 1A substances in concentrations equal to or greater than 1% are included in the threshold calculations. The 1% concentration limit is consistent with the reporting requirements under the WHMIS. Minor constituents (with some exceptions) are not included on MSDSs. **However, NPRI Part 1A by-products at any concentration by weight must be included in the calculation of the 10-tonne reporting threshold.**

The NPRI applies to any person who possesses or who may reasonably be expected to have access to the types of information requested. This reasonable expectation limits the reporting liability of facilities which cannot easily determine minor amounts of NPRI substances in their feedstock or process.

To determine if an NPRI Part 1A substance is a by-product, the following criteria should be considered:

- The NPRI Part 1A substance is not relevant to the manufacture, processing or other use of substances at the facility. It may be the product of an unwanted side-reaction or an impurity in a feedstock material. If the NPRI by-product was absent, there would be no effect on the process.

- NPRI Part 1A substances which meet the above criteria are only considered by-products if they are released to the environment or transferred off site for disposal. Substances that are recycled or that remain in the final product are excluded from the by-product definition.

The following examples illustrate application of the by-product definition:

Example 1
Hydrogen fluoride is incidentally manufactured and released during aluminum smelting. For some large facilities, more than 10 tonnes may be released to the atmosphere at concentrations of less than 1%. Since hydrogen fluoride is an NPRI Part 1A substance, the weight of the hydrogen fluoride by-product must be used in the calculation of the 10-tonne reporting threshold.

Example 2
Manganese and nickel are incidentally present in coal. During combustion, a portion of these metals is concentrated in the ash which is transferred off site for disposal and a portion of the metals is released in stack emissions. The weight of the heavy metal by-products must be included in the calculation of the 10-tonne reporting threshold, regardless of the initial concentrations of the metals in the coal.

Example 3
An NPRI Part 1A substance is present in trace amounts in a product that is being packaged for retail sale. The quantity of this substance released through spillage or through fugitive air emissions cannot be determined because the formulation of the product is proprietary or the substance concentration is not listed on the MSDS and more detailed information cannot be obtained from the supplier or manufacturer. Although this NPRI Part 1A substance is considered a by-product, it is not included in the calculation of the 10-tonne reporting threshold because it is an unreasonable expectation that the facility could obtain information on the substance identity, concentration or quantity.

Article

General
An "article" is defined as a manufactured item that does not release an NPRI substance under normal conditions of processing or use. When articles are processed and there are no releases, or the releases are recycled 100% with due care, the NPRI substances in that article need not be included in the threshold calculation. Exercising "due care" in ensuring 100% recycling means that the facility generated less than 1 kg of the NPRI Part 1A substance as waste during the calendar year.

Welding
Environment Canada is developing guidance for the welding industry. NPRI reporting guidance will be available for both non-consumable and consumable welding. This guidance was not ready for inclusion in this Guide. However, preliminary guidance material can be obtained by contacting your regional NPRI office.

Calculating the 10-tonne Reporting Threshold

The 10-tonne reporting threshold is based on the quantity of an NPRI Part 1A substance manufactured, processed or otherwise used at the facility at concentrations equal to or greater than 1% **plus** the quantity of the same NPRI Part 1A substance, at any concentration, that is considered to be a by-product which is released on site to the environment or transferred off site for disposal.

When calculating the 10-tonne reporting threshold, **include** the quantity of an NPRI Part 1A substance that is:

- manufactured at a concentration equal to or greater than 1%
- processed at a concentration equal to or greater than 1%
- otherwise used at a concentration equal to or greater than 1%, and
- a by-product, at any concentration, released on site to the environment or transferred off site for disposal.

Any NPRI Part 1A substances that are recycled off site and returned to the facility should be treated as the equivalent of newly-purchased material for the purposes of NPRI threshold determinations. Since an NPRI Part 1A substance may undergo many processes in a facility, care should be taken not to double-count process streams when calculating the reporting threshold.

NPRI Part 1A Substances Equal to or Greater than 1% Concentration

The total quantity of an NPRI Part 1A substance manufactured, processed or otherwise used at concentrations greater than or equal to 1%, at any time or in any part of the facility, **must** be used in the calculation of the 10-tonne reporting threshold.

The quantity of a substance received by a facility at 30% concentration and then diluted to less than 1% for use, is included in the threshold calculation. A substance received at the facility at less than 1% and subsequently concentrated to 5% would also be included in the threshold calculation.

Facilities that blend or formulate NPRI Part 1A substances such as solvents, must include the total quantity of the substance blended or mixed in the reporting threshold calculation since blending, mixing and formulating are considered processing, which is a reportable activity.

Facilities that repackage or transfer NPRI Part 1A substances between containers need only consider the total quantity of the substance repackaged or transferred.

If only a range of concentrations is available for a substance present in a mixture, use the average of the range for threshold determinations.

NPRI Part 1A Substances of Less than 1% Concentration

The total quantity of an NPRI Part 1A substance manufactured, processed, or otherwise used at less than 1% is not included in the calculation of the 10-tonne reporting threshold, provided that the substance was not received as a more concentrated solution and subsequently diluted to less than 1% for manufacturing, processing or other use.

The following examples illustrate how to handle substances manufactured, processed or otherwise used at a concentration of less than 1%:

Example 1

A facility uses a pre-polymer mixture which contains unreacted di-*n*-octyl phthalate monomer at a concentration of less than 1%. The monomer remains in the final product after the processing is complete. The polymer is used to make articles sold for distribution. The unreacted monomer is not released and remains in the product distributed in commerce and therefore is not included in calculating the 10-tonne threshold.

Example 2

Gases produced during coking of coal are completely recovered, used to supply heat and not released; therefore, they are not considered by-products. The quantity produced at concentrations of less than 1% should not be used in the calculation of the reporting threshold.

Example 3

Metal cuttings, transferred off site for disposal, contain alloyed nickel at a concentration of less than 1%. The nickel is an essential component of the alloy, therefore it is not incidentally processed and is not considered to be a by-product. The nickel in the metal cuttings is not included in the calculation of the 10-tonne reporting threshold.

Example of Calculating the Reporting Threshold

The following example illustrates the calculation of the 10-tonne reporting threshold. This facility has several processes in which an NPRI Part 1A substance is manufactured, processed or otherwise used.

MATERIAL CONTAINING PART 1A SUBSTANCE "Z"	TOTAL WEIGHT OF MATERIAL CONTAINING PART 1A SUBSTANCE "Z"	CONCENTRATION OF PART 1A SUBSTANCE "Z" IN THE MATERIAL OR STREAM	NET WEIGHT OF PART 1A SUBSTANCE "Z"
Process stream 1	150 tonnes	5.00%	7.5 tonnes
Raw material in process 2	2 tonnes	100.00%	2.0 tonnes
Raw material in process 3	45 tonnes	0.20%	n/a
By-product released from process 4	10 000 tonnes	0.01%	1.0 tonne
		Total weight of substance "Z"	**10.5 tonnes**

1. In the first process, the NPRI Part 1A substance "Z" is present at 5% concentration and is included in the threshold calculation.
2. In the second process, a raw material added to the process is pure substance "Z". It is also included in the threshold calculation, regardless of any subsequent dilution in the process. This also applies to a substance received at the facility at less than 1% which is subsequently concentrated to more than 1% in the process.
3. The weight of substance "Z" in the raw material used in process 3 is not included in the threshold calculation because the concentration is less than 1%. Note, however, that since the facility in this example must report because it meets the 10-tonne reporting threshold, it is required to take into account and report releases and transfers from all processes including those, such as process 3, which were not used in the threshold calculations.
4. The weight of substance "Z" produced and released from process 4 is included in the calculation because it is a by-product. The concentration criterion does not apply to by-products.

In this example, the facility would be required to submit a report to the NPRI (assuming it also met the 20 000-hour employee threshold) because the total amount of substance "Z" manufactured, processed or otherwise used at the facility exceeded 10 tonnes for the calendar year.

Reporting Criteria for Part 1B Substances

Overview

Part 1B substances include mercury[1], cadmium[1], arsenic[1], hexavalent chromium compounds, lead[2] and tetraethyl lead. These substances are pollutants which have significant environmental and human health impacts at relatively low levels. They occur naturally in the environment, but human activities can concentrate them to levels that are toxic to human health and the environment. Because minimal releases of Part 1B substances may result in significant adverse effects, Environment Canada lowered the concentration and reporting thresholds for Part 1B substances.

Substances

New for 2002

The compounds of cadmium, arsenic, hexavalent chromium, lead and tetraethyl lead were added to the NPRI Part 1B list of substances for 2002. With the exception of hexavalent chromium compounds, these substances were formerly on the NPRI Part 1A substance list.

The Part 1B substances and their reporting criteria are provided in Table 5. With the exception of tetraethyl lead, the pure element and any substance, alloy or mixture of any Part 1B substance must be reported as the equivalent weight of its respective element. Tetraethyl lead is reported as the pure compound.

Note that "tetraethyl lead" and "lead (and its compounds)" both appear on the NPRI Part 1B list. Also note that an additional qualifier has been added for "lead (and its compounds)" for the 2002 reporting year "does not include lead (and its compounds) in stainless steel, brass or bronze alloys". Therefore, when submitting a report for "lead (and its compounds)", exclude the lead contribution from tetraethyl lead, stainless steel, brass and bronze alloys. Apply the reporting criteria to each substance separately. If required, complete separate reports for "lead (and its compounds)" and "tetraethyl lead".

Units

Report on-site releases and off-site transfers of Part 1B substances in kilograms (kg).

Reporting Criteria

The reporting criteria for Part 1B substances are outlined in Figure 4.

A facility is required to report on-site releases and off-site transfers of Part 1B substances if, during the 2002 calendar year:

- employees worked a total of 20 000 hours or more or the facility was used for an activity to which the 20 000-hour employee threshold does not apply (listed in Table 4),

AND

- a Part 1B substance was manufactured, processed or otherwise used at a concentration and quantity meeting or exceeding the thresholds outlined in Table 5.

[1] and its compounds

[2] and its compounds, except tetraethyl lead (CAS No. 78-00-2), does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

TABLE 5: MASS AND CONCENTRATION THRESHOLDS FOR PART 1B SUBSTANCES

SUBSTANCE	CAS NO.	MASS THRESHOLD	CONCENTRATION THRESHOLD (BY WEIGHT)
Mercury[1]	*	5 kg	n/a
Cadmium[1]	*	5 kg	0.1%
Arsenic[1]	*	50 kg	0.1%
Hexavalent chromium compounds	*	50 kg	0.1%
Lead[2]	*	50 kg	0.1%
Tetraethyl lead	78-00-2	50 kg	0.1%

[1] and its compounds

[2] and its compounds, does not include tetraethyl lead or lead contained in stainless steel, brass or bronze alloys

* No single CAS No. applies to this substance

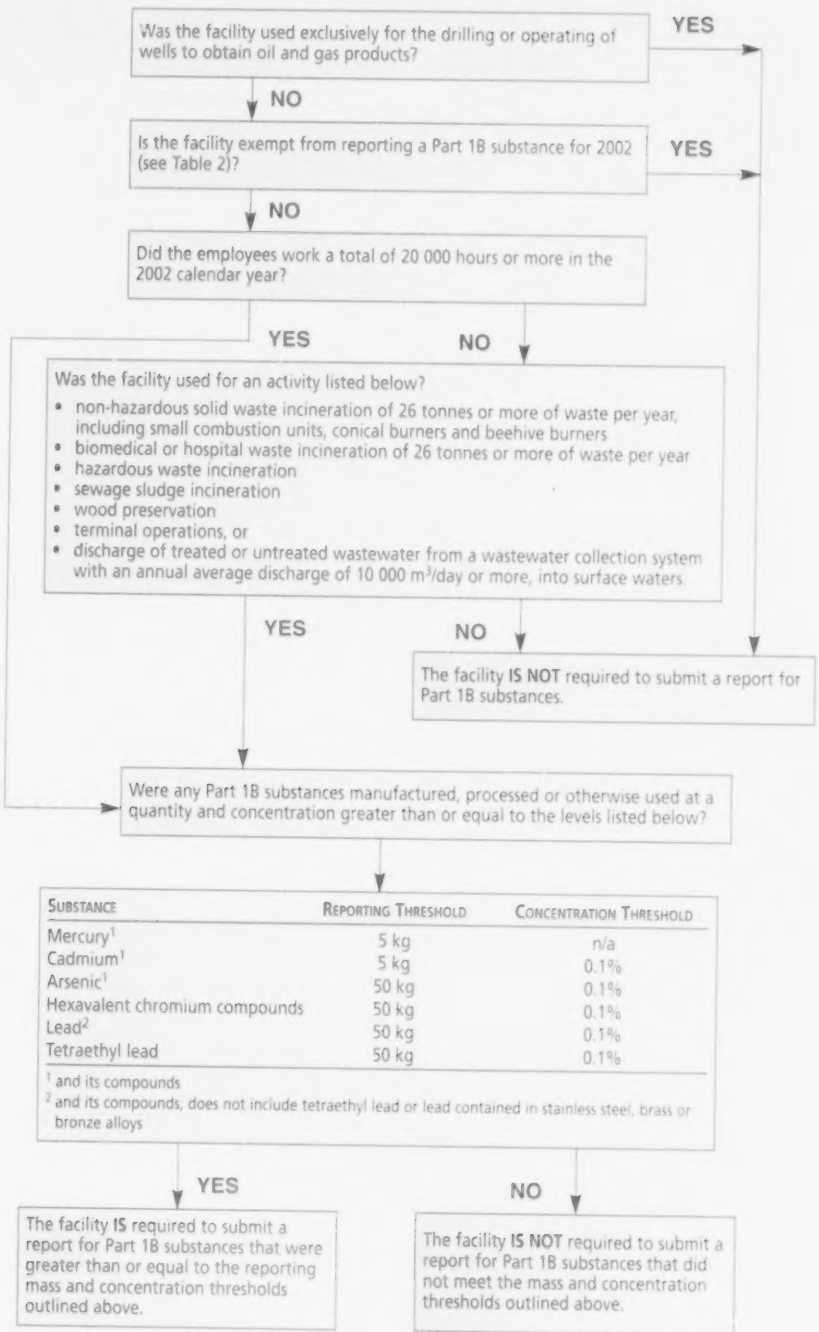
The 1% concentration exemption included in the 10-tonne manufacture, process or other use threshold for Part 1A substances **does not** apply to Part 1B substances.

A Material Safety Data Sheet (MSDS) is an important source of information on the composition of a purchased product. Suppliers of hazardous materials are required, as part of the Workplace Hazardous Materials Information System (WHMIS), to supply MSDSs on request. Note that minor constituents at concentrations lower than 1% may not be included on the MSDS.

Once you have determined that your facility is required to submit a report for a Part 1B substance, all on-site releases and all off-site transfers for disposal or recycling of that substance are reportable, regardless of their concentration or quantity (including "zero" releases and transfers).

Locating and estimating documents listed in the References and Bibliography section provide detailed information for estimating releases and transfers for some Part 1B substances. In addition, some examples of estimating releases and transfers of Part 1B substances are provided in Appendix 7. Appendix 11 lists various materials and products known to contain mercury. The Factor Information REtrieval (FIRE) System, discussed in Appendix 12, provides emission factors for Part 1B substances.

FIGURE 4: REPORTING CRITERIA FOR PART 1B SUBSTANCES


Was the facility used exclusively for the drilling or operating of wells to obtain oil and gas products?
YES
NO
Is the facility exempt from reporting a Part 1B substance for 2002 (see Table 2)?
YES
NO
Did the employees work a total of 20 000 hours or more in the 2002 calendar year?
YES
NO
Was the facility used for an activity listed below?
• non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
• biomedical or hospital waste incineration of 26 tonnes or more of waste per year
• hazardous waste incineration
• sewage sludge incineration
• wood preservation
• terminal operations, or
• discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m3/day or more, into surface waters.
YES
NO
The facility IS NOT required to submit a report for Part 1B substances.
Were any Part 1B substances manufactured, processed or otherwise used at a quantity and concentration greater than or equal to the levels listed below?
YES
NO
The facility IS required to submit a report for Part 1B substances that were greater than or equal to the reporting mass and concentration thresholds outlined above.
The facility IS NOT required to submit a report for Part 1B substances that did not meet the mass and concentration thresholds outlined above.

Substance	Reporting Threshold	Concentration Threshold
Mercury[1]	5 kg	n/a
Cadmium[1]	5 kg	0.1%
Arsenic[1]	50 kg	0.1%
Hexavalent chromium compounds	50 kg	0.1%
Lead[2]	50 kg	0.1%
Tetraethyl lead	50 kg	0.1%

[1] and its compounds
[2] and its compounds, does not include tetraethyl lead or lead contained in stainless steel, brass or bronze alloys

Definitions

The terms "manufacture", "process" and "other use" are defined in the previous section (for Part 1A substances).

Article

An "article" is defined as a manufactured item that does not release an NPRI substance under normal conditions of processing or use. This is further explained in the previous section for Part 1A substances. However, there is no quantitative measure of "due care" in recycling Part 1B substances because even minimal releases of these substances can cause significant adverse effects and can reasonably be expected to contribute to exceeding their low thresholds. Therefore, if an "article" containing a Part 1B substance is processed or used and there are releases, the Part 1B substance **must** be included in the threshold calculation.

Special guidance for welding activities is being developed by Environment Canada and may impact the reporting of Part 1B NPRI substances in welding rods or welded materials. Contact your regional NPRI office for more information.

Example 1

A sealed, glass bulb containing mercury used in a levelling switch meets the definition of an article. However, the quantity of mercury in the switch must be included in a facility's calculation of the 5-kg reporting threshold if the item loses its article status, i.e., the bulb is broken, thus allowing a release of mercury. As long as the bulbs remain intact, they are considered articles and are therefore not included in calculating the reporting threshold.

Example 2

A lead-acid battery meets the definition of an article. A metal reclamation facility accepts spent lead-acid batteries for recycling. The batteries are broken into pieces in a hammermill and their parts (acid, lead and plastic) are subsequently reclaimed. In this context, the batteries lose their article status since they are broken apart during the recycling process. Consequently, the lead content of the battery must be included in the facility's calculation of the 50-kg reporting threshold.

Reporting Criteria for Part 2 Substances – 17 Polycyclic Aromatic Hydrocarbons (PAHs)

Overview

Polycyclic aromatic hydrocarbons (PAHs) may be used as commercial chemicals or incidentally manufactured in certain industrial processes. PAHs are listed as a group on the List of Toxic Substances under the CEPA 1999.

The inclusion of the 17 PAHs in the NPRI (Table 6) is based on the PAHs classified as persistent, bioaccumulative and toxic substances by Environment Canada's ARET program, known as ARET Group A. Since these 17 PAHs are mostly incidentally manufactured and released or transferred from facilities, rather than used as commercial chemicals, Environment Canada has set reporting criteria based on releases and transfers resulting from incidental manufacture.

Two PAHs remain on the NPRI Part 1A substance list – anthracene (CAS No. 120-12-7) and naphthalene (CAS No. 91-20-3). These substances are commercial chemicals used in significant quantities, and are less toxic than the 17 PAHs added to the NPRI at a lower threshold in 2000. Environment Canada has retained the 10-tonne manufacture, process and other use reporting threshold for anthracene and naphthalene.

Substances

The 17 individual PAHs, listed individually in the NPRI, are presented in Table 6.

TABLE 6: PART 2 SUBSTANCES (17 PAHs)

CAS No.	Substance Name	CAS No.	Substance Name
56-55-3	Benzo(a)anthracene	224-42-0	Dibenz(a,j)acridine
218-01-9	Benzo(a)phenanthrene	53-70-3	Dibenzo(a,h)anthracene
50-32-8	Benzo(a)pyrene	189-55-9	Dibenzo(a,i)pyrene
205-99-2	Benzo(b)fluoranthene	194-59-2	7H-Dibenzo(c,g)carbazole
192-97-2	Benzo(e)pyrene	206-44-0	Fluoranthene
191-24-2	Benzo(g,h,i)perylene	193-39-5	Indeno(1,2,3-c,d)pyrene
205-82-3	Benzo(j)fluoranthene	198-55-0	Perylene
207-08-9	Benzo(k)fluoranthene	85-01-8	Phenanthrene
		129-00-0	Pyrene

The NPRI has added an additional substance listing in the NPRI reporting software – "PAHs, total Part 2" – which refers to all 17 PAHs or any combination thereof listed in Table 6. The 17 PAHs may be reported under the substance listing titled "PAHs, total Part 2" **only** if you do not have information available to estimate releases and transfers for any of the individual PAHs.

Anthracene and naphthalene are Part 1A substances; as such, their reporting criteria differ from those discussed in this section. Do not include anthracene and naphthalene when determining whether your facility met the reporting criteria for, or calculating on-site releases or off-site transfers of, the 17 PAHs listed in Table 6. Do not include anthracene and naphthalene under the "PAHs, total Part 2" listing.

Units

Report on-site releases and off-site transfers of individual PAHs listed in Table 6 or "PAHs, total Part 2" in kilograms (kg).

Reporting Criteria

The 17 PAHs listed in Part 2 of the NPRI are mostly incidentally manufactured and released or transferred from facilities, rather than used as commercial chemicals. For this reason, Environment Canada developed reporting criteria based on releases and transfers resulting from incidental manufacture.

With the exception of wood preservation using creosote, the reporting criteria for PAHs listed in Table 6 are as follows:

- reporting the 17 PAHs is based on the quantities of the substances incidentally manufactured and released or transferred, **not** on the quantities manufactured, processed, or otherwise used
- you must consider the quantities of **all** 17 individual PAHs incidentally manufactured together in determining if your facility met the reporting threshold, and
- the reporting threshold is 50 kg.

The substance-specific reporting criteria for the 17 PAHs listed in Table 6 are outlined in Figure 5. On-site releases and off-site transfers must be reported for the individual PAH substances even though the 50-kg reporting threshold applies to total releases and transfers of all 17 PAHs.

With the exception of wood preservation using creosote (see below), you must submit substance reports for one or more of the 17 PAHs listed in Table 6 that were incidentally manufactured if, during the 2002 calendar year:

- employees worked a total of 20 000 hours or more, or the facility was used for an activity to which the 20 000-hour employee threshold does not apply (listed in Table 4)

AND

- any individual PAH (listed in Table 6) was incidentally manufactured, and the sum of all PAHs incidentally manufactured and released on site or transferred off site totalled 50 kg or more.

Wood Preservation Using Creosote

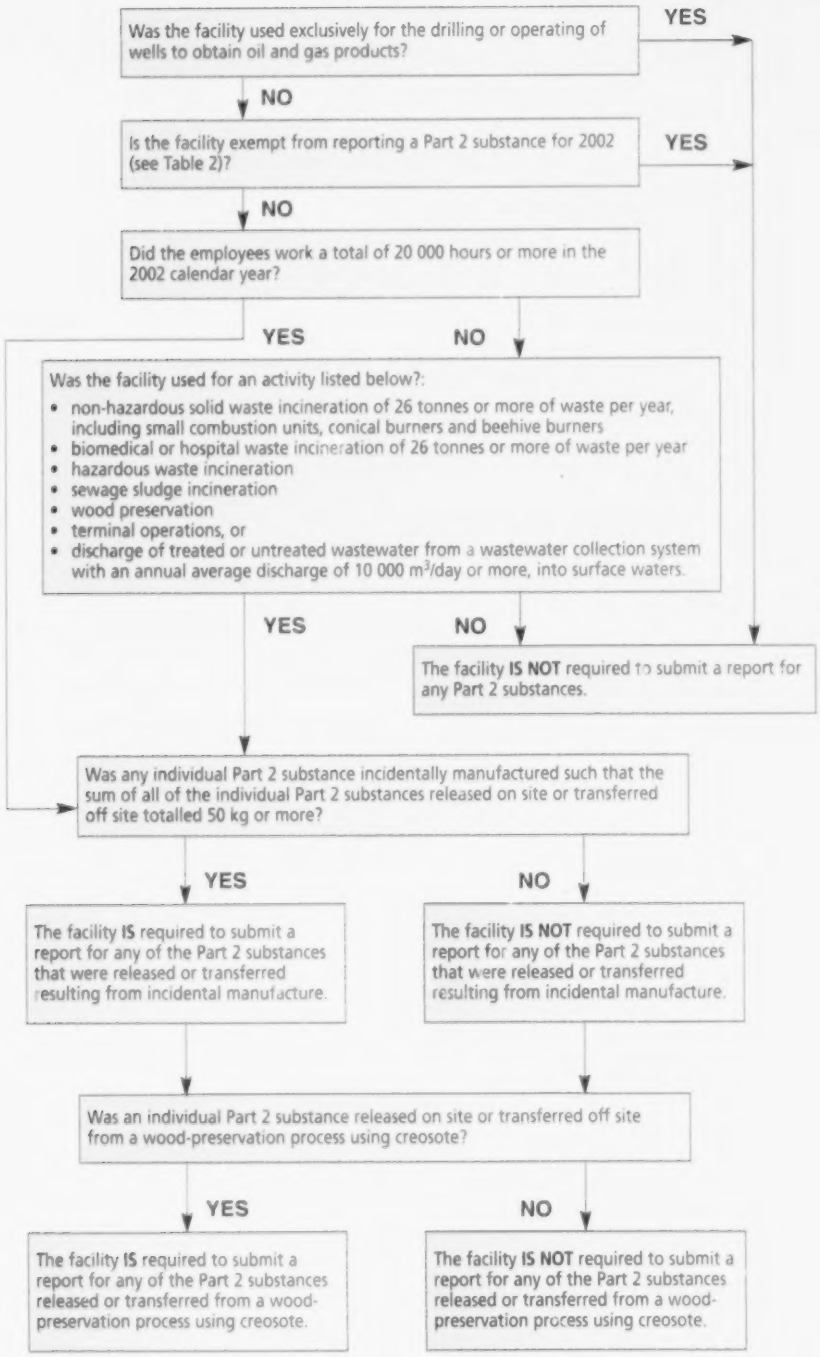
Wood preservation means the use of a preservative for the preservation of wood by means of heat or pressure treatment, or both, and includes the manufacture, blending or reformulation of wood preservatives for that purpose. There is no 50-kg reporting threshold for PAHs released or transferred from a wood-preservation process using creosote because the PAHs are contained in the creosote and not incidentally manufactured.

PAHs can constitute up to 90% of creosote and for this reason, may be released or transferred from most wood-preservation activities using this material.

A facility used for wood preservation must submit a report for each/any of the 17 individual PAHs released on site or transferred off site from a wood-preservation process using creosote, regardless of the quantity of PAHs released or transferred or the number of hours worked by employees. All PAHs released on site or transferred off site from wood-preservation processes using creosote must be reported, regardless of the quantity.

Environment Canada has prepared a technical guide entitled *Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory* to assist facilities using creosote for wood preservation to estimate their releases. This technical guide is also available on the NPRI reporting software CD and the NPRI Web site <http://www.ec.gc.ca/pdb/npri/>.

FIGURE 5: REPORTING CRITERIA FOR PART 2 SUBSTANCES – 17 PAHs


Was the facility used exclusively for the drilling or operating of wells to obtain oil and gas products?
YES
NO
Is the facility exempt from reporting a Part 2 substance for 2002 (see Table 2)?
YES
NO
Did the employees work a total of 20 000 hours or more in the 2002 calendar year?
YES
NO
Was the facility used for an activity listed below?:
• non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
• biomedical or hospital waste incineration of 26 tonnes or more of waste per year
• hazardous waste incineration
• sewage sludge incineration
• wood preservation
• terminal operations, or
• discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m³/day or more, into surface waters.
YES
NO
The facility IS NOT required to submit a report for any Part 2 substances.
Was any individual Part 2 substance incidentally manufactured such that the sum of all of the individual Part 2 substances released on site or transferred off site totalled 50 kg or more?
YES
NO
The facility IS required to submit a report for any of the Part 2 substances that were released or transferred resulting from incidental manufacture.
The facility IS NOT required to submit a report for any of the Part 2 substances that were released or transferred resulting from incidental manufacture.
Was an individual Part 2 substance released on site or transferred off site from a wood-preservation process using creosote?
YES
NO
The facility IS required to submit a report for any of the Part 2 substances released or transferred from a wood-preservation process using creosote.
The facility IS NOT required to submit a report for any of the Part 2 substances released or transferred from a wood-preservation process using creosote.

Reporting Criteria for Part 3 Substances – Dioxins/Furans and Hexachlorobenzene (HCB)

Overview

Polychlorinated dibenzo-*p*-dioxins (PCDD or dioxins), polychlorinated dibenzofurans (PCDF or furans) and hexachlorobenzene (HCB) are released primarily as by-products of industrial and combustion processes, but are also found as contaminants in certain pesticides or chlorinated solvents. HCB may also be found as a contaminant in ferric chloride used for water or wastewater treatment. These substances have been identified as toxic substances under the CEPA 1999, and are also slated for virtual elimination*.

Facilities engaged in identified activities (see Table 9) have the potential to incidentally manufacture dioxins/furans or HCB and are therefore required to submit a report to the NPRI. The identified activities were selected by Environment Canada to cover all main point sources of dioxins/furans and HCB releases being targetted by the Canada-wide Standards initiatives for dioxins/furans and HCB. Reporting by limited sectors known to release these substances will capture all significant releases from such facilities, while minimizing reporting burden on other NPRI reporting facilities.

Substances

Dioxins/Furans

Substance reports are required for 17 dioxins/furans; these dioxins/furans and their respective CAS numbers are listed in Table 7. There is no CAS number provided for the dioxin/furan group since the listing includes 17 individual dioxin and furan congeners. A congener is a compound belonging to a family of compounds having similar chemical structure, but differing in the number and position of hydrogen substitutes.

Because these 17 congeners have related, cumulative toxic effects, report on-site releases and off-site transfers of dioxins/furans as a group, in grams of international toxicity equivalents (TEQ) with respect to the most toxic congener of dioxin (i.e., 2,3,7,8-tetrachlorodibenzo-*p*-dioxin). The quantity in grams of TEQ of dioxins/furans released or transferred is estimated by adding the individual units of TEQ for each congener. A more detailed description of TEQ and its calculation is provided in Step 2.

TABLE 7: DIOXIN AND FURAN CONGENERS INCLUDED IN THE NPRI DIOXINS/FURANS GROUP

CAS No.	Name of Congener
1746-01-6	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin
3268-87-9	Octachlorodibenzo-*p*-dioxin
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
39001-02-0	Octachlorodibenzofuran

* Substances that are determined to be CEPA-toxic, persistent, bioaccumulative and primarily the result of human activity are "slated for virtual elimination". Virtual elimination of a toxic substance released into the environment as a result of human activity is defined in subsection 65(1) of the CEPA 1999 as "the ultimate reduction in the quantity or concentration of the substance in the release below the level of quantification".

Hexachlorobenzene (HCB)

Hexachlorobenzene (HCB) has the CAS No. 118-74-1.

Units

Dioxins/Furans

Report quantities of the 17 congeners of dioxins/furans listed in Table 7 that were released on site and transferred off site in grams of international toxic equivalents (g TEQ). TEQs are further discussed in Step 2.

HCB

You must report the quantities of HCB released on site and transferred off site in grams (g).

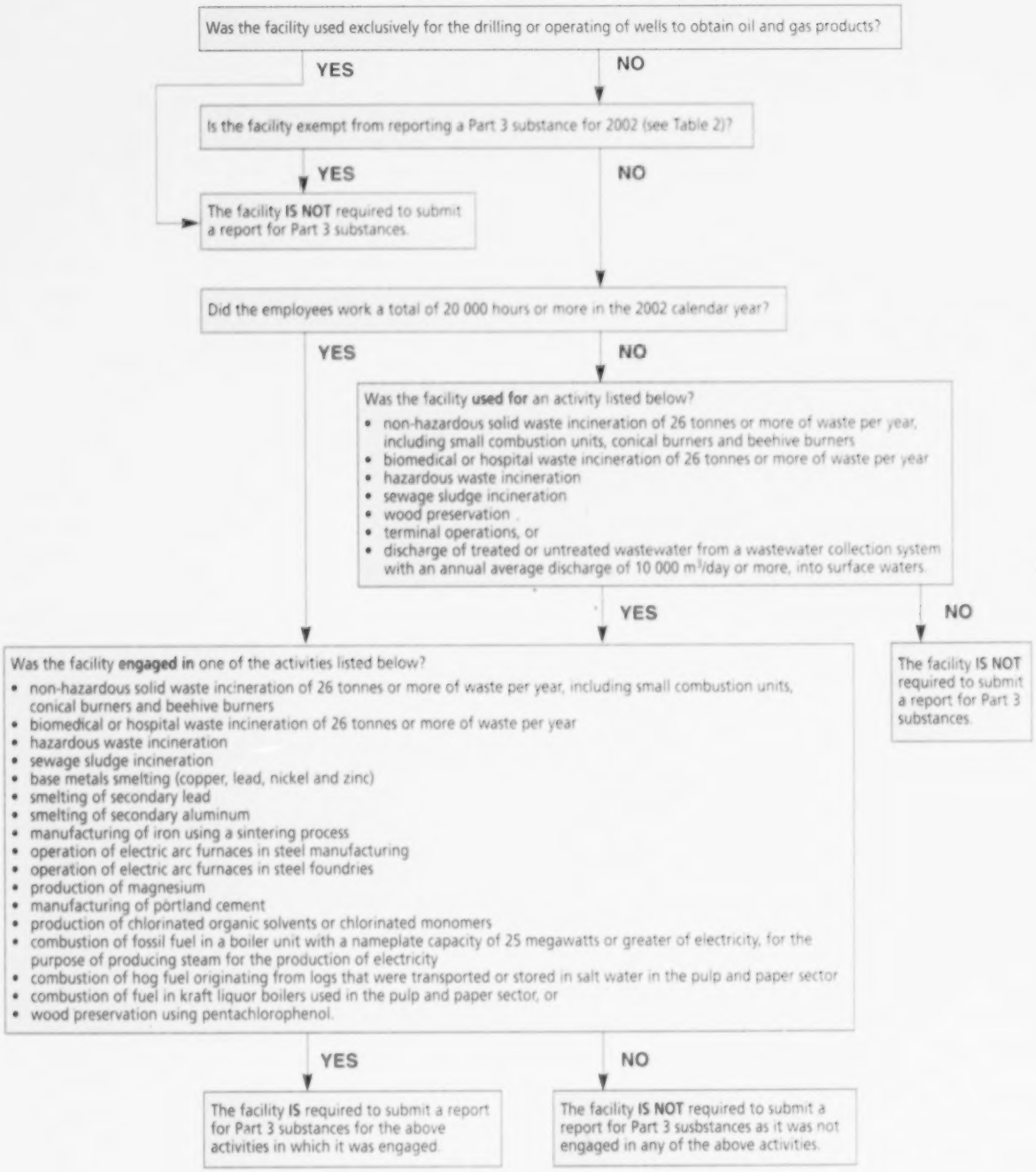
Reporting Criteria

The reporting criteria for dioxins/furans and HCB are summarized in Figure 6.

If a facility was "**used for**" an activity, then that facility was used primarily or exclusively for that activity.

If a facility was "**engaged in**" an activity, then the activity occurred at the facility at any time during the year, regardless of extent or the primary purpose of the facility.

FIGURE 6: REPORTING CRITERIA FOR PART 3 SUBSTANCES – DIOXINS/FURANS AND HCB


Was the facility used exclusively for the drilling or operating of wells to obtain oil and gas products?
YES
NO
Is the facility exempt from reporting a Part 3 substance for 2002 (see Table 2)?
YES
NO
The facility IS NOT required to submit a report for Part 3 substances.
Did the employees work a total of 20 000 hours or more in the 2002 calendar year?
YES
NO
Was the facility used for an activity listed below?
• non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
• biomedical or hospital waste incineration of 26 tonnes or more of waste per year
• hazardous waste incineration
• sewage sludge incineration
• wood preservation
• terminal operations, or
• discharge of treated or untreated wastewater from a wastewater collection system with an annual average discharge of 10 000 m³/day or more, into surface waters.
YES
NO
The facility IS NOT required to submit a report for Part 3 substances.
Was the facility engaged in one of the activities listed below?
• non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
• biomedical or hospital waste incineration of 26 tonnes or more of waste per year
• hazardous waste incineration
• sewage sludge incineration
• base metals smelting (copper, lead, nickel and zinc)
• smelting of secondary lead
• smelting of secondary aluminum
• manufacturing of iron using a sintering process
• operation of electric arc furnaces in steel manufacturing
• operation of electric arc furnaces in steel foundries
• production of magnesium
• manufacturing of portland cement
• production of chlorinated organic solvents or chlorinated monomers
• combustion of fossil fuel in a boiler unit with a nameplate capacity of 25 megawatts or greater of electricity, for the purpose of producing steam for the production of electricity
• combustion of hog fuel originating from logs that were transported or stored in salt water in the pulp and paper sector
• combustion of fuel in kraft liquor boilers used in the pulp and paper sector, or
• wood preservation using pentachlorophenol.
YES
NO
The facility IS required to submit a report for Part 3 substances for the above activities in which it was engaged.
The facility IS NOT required to submit a report for Part 3 susbstances as it was not engaged in any of the above activities.

A facility is required to submit substance reports for dioxins/furans and HCB if:

- the facility was used for one of the activities identified in Table 8 *or* met the 20 000-hour employee threshold,

AND

- the facility was engaged in one of the activities listed in Table 9.

TABLE 8: ACTIVITIES TO WHICH THE 20 000-HOUR EMPLOYEE THRESHOLD DOES NOT APPLY

Activity
a) non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
b) biomedical or hospital waste incineration of 26 tonnes or more of waste per year
c) hazardous waste incineration
d) sewage sludge incineration
e) wood preservation
f) terminal operations
g) wastewater collection systems discharging 10 000 m^3/day or more, into surface waters

Facilities used primarily for incineration or wood preservation using pentachlorophenol are required to submit substance reports for dioxins/furans and HCB regardless of the number of employee hours worked. A facility used for terminal operations or wastewater collection does not automatically trigger dioxin/furan and HCB reporting. Wastewater collection facilities or terminal operations must also have been engaged in one of the activities in Table 9 to trigger reporting.

TABLE 9: ACTIVITIES FOR WHICH DIOXINS/FURANS AND HCB REPORTS ARE REQUIRED (20 000-HOUR EMPLOYEE THRESHOLD APPLIES)

Activity
a) non-hazardous solid waste incineration of 26 tonnes or more of waste per year, including small combustion units, conical burners and beehive burners
b) biomedical or hospital waste incineration of 26 tonnes or more of waste per year
c) hazardous waste incineration
d) sewage sludge incineration
e) base metals smelting (this refers to copper, lead, nickel and zinc)
f) smelting of secondary lead
g) smelting of secondary aluminum
h) manufacturing of iron using a sintering process
i) operation of electric arc furnaces in steel manufacturing
j) operation of electric arc furnaces in steel foundries
k) production of magnesium
l) manufacturing of portland cement
m) production of chlorinated organic solvents or chlorinated monomers
n) combustion of fossil fuel in a boiler unit, with a nameplate capacity of 25 megawatts or greater of electricity, for the purpose of producing steam for the production of electricity
o) combustion of hog fuel originating from logs that were transported or stored in salt water in the pulp and paper sector
p) combustion of fuel in kraft liquor boilers used in the pulp and paper sector
q) wood preservation using pentachlorophenol

A facility which met the 20 000-hour employee threshold and was engaged in one of the activities listed in Table 9 is required to submit substance reports for dioxins/furans and HCB.

A description of what and how you must report is given in Step 2. Examples of estimation methods and reporting scenarios are provided in Appendix 7. **Special reporting requirements** for dioxins/furans and HCB are also outlined in Step 2.

Description of Activities Listed in Tables 8 and 9

Table 8 Activities (no employee threshold)

All the activities listed in Table 8 were previously described. For a detailed description of waste incineration and its various classes, wood preservation, terminal operations and wastewater collection systems, see Step 1, Employee Criteria.

Table 9 Activities (20 000-hour employee threshold applies)

The first four activities in Table 9 (a-d) were previously described. For a detailed description of waste incineration and its various classes, see Step 1, Employee Criteria. While reviewing the definitions for waste incineration, keep in mind that a facility with a primary business activity that is not incineration but which is nonetheless engaged in some form of incineration at the facility, is required to report for dioxins/furans and HCB only if it also met the 20 000-hour employee threshold.

Smelting Activities

Smelting includes the melting of raw or scrap materials (containing metals) to produce metal for further processing into metal products (i.e., castings, ingots, sheets, etc.). The smelting process is typically accompanied by a chemical change in which impurities are removed (i.e., the addition of flux to separate metals from other contaminants).

e) ***Base metals smelting***

Base metals refers to copper, lead, nickel and zinc. This activity does not include smelting of aluminum or any other metals. It also does not include the smelting of secondary lead, which is a separate activity listed in Table 9 (see description below).

f) ***Smelting of secondary lead***

Secondary lead refers to lead-bearing scrap or lead-bearing materials, other than lead-bearing concentrates derived from a mining operation. Facilities engaged in smelting of lead-bearing concentrates derived from a mining operation are considered to be base metal smelters (see description above).

g) ***Smelting of secondary aluminum***

Secondary aluminum refers to aluminum-bearing scrap or aluminum-bearing materials. Secondary aluminum smelting involves two processes – pre-cleaning and smelting – both of which may produce emissions of dioxins/furans.

Other Activities

h) ***Manufacturing of iron using a sintering process***

Sintering is the welding together and growth of contact area between two or more initially distinct particles at temperatures below the melting point, but above one-half of the melting point (in Kelvin). In sintering operations, dioxins/furans may be formed as unwanted by-products during high-temperature decomposition and combustion of raw materials containing chlorine and organic compounds.

i) ***Operation of electric arc furnaces in steel manufacturing***

In an electric arc furnace, material is heated by the heat energy released from an electric arc. The electric arc is a component of an electric circuit, like a resistor, but with its own peculiar characteristics. Dioxins/furans may be formed as unwanted by-products during high-temperature decomposition and combustion of raw materials containing chlorine and organic compounds.

j) ***Operation of electric arc furnaces in steel foundries***

In an electric arc furnace, material is heated by the heat energy released from an electric arc, during which dioxins/furans and HCB may be formed.

k) ***Production of magnesium***

Production of magnesium from magnesium chloride by electrolysis may result in the generation of dioxins/furans and HCB.

l) Manufacturing of portland cement

Portland cement is a fine greyish powder consisting of four basic materials – lime, silica, alumina and iron compounds. Cement production involves heating (pyroprocessing) the raw materials to a very high temperature in a rotating kiln to induce chemical reactions that produce a fused material called clinker. The cement clinker is further ground into a fine powder, then mixed with gypsum to form portland cement.

m) Production of chlorinated organic solvents or chlorinated monomers

This activity is limited to the intentional manufacturing of chlorinated organic solvents or chlorinated monomers, and does not include coincidental production.

n) Combustion of fossil fuel in a boiler unit, with a nameplate capacity of 25 megawatts or greater of electricity, for the purpose of producing steam for the production of electricity

Fossil fuel means a fuel that is in a solid or liquid state at standard temperature and pressure, such as coal, petroleum or any liquid or solid fuel derivatives. This activity includes electric power-generation utilities and large industrial facilities co-generating electric power using waste heat from industrial processes. It does not include combustion of natural gas or other fuels that are gaseous in form at ambient pressure and temperature. It also does not include diesel generators, which are not boiler units.

o) Combustion of hog fuel originating from logs that were transported or stored in salt water in the pulp and paper sector

Pulp and paper boilers burning salt-laden wood are unique to British Columbia. Dioxins/furans are emitted from the burning of salt-contaminated hog fuel. Logs transported and stored in salt water take up chlorine into the bark. The bark is stripped from logs and ground up with other waste wood to produce hog fuel. The material is then used as boiler fuel to produce heat and electrical energy for pulp and paper processes. The *Canada-wide Standards for Dioxins and Furans* state that every boiler covered by the Standards will be tested twice each year to determine the emissions of dioxins/furans to air for the years prior to 2003, and annually for the year 2003 and beyond.

p) Combustion of fuel in kraft liquor boilers used in the pulp and paper sector

A kraft liquor boiler burns black liquor, composed mostly of lignin, the residue from the digester in a kraft (sulphate) pulping process. The boiler recovers chemical products from the combusted black liquor, which are later recycled, and also produces steam which is used in mill process operations.

q) Wood preservation using pentachlorophenol

Pentachlorophenol (PCP), by its chemical structure, is a close surrogate to HCB. PCP is derived from HCB by substituting one of HCB's six chloro-substituents with a hydroxyl group. Given its chemical similarity to HCB and that its manufacturing ingredients contain the precursors for dioxin/furan production (i.e., chlorinated aromatics), the manufacture of PCP often results in the incidental manufacture of both HCB and dioxins/furans. Hence, dioxins/furans and HCB are present in PCP formulations used for wood preservation and may be released or transferred when used for wood preservation.

Reporting Criteria for Part 4 Substances – Criteria Air Contaminants (CACs)

Overview

Environment Canada has been working with the provinces, territories and industry to estimate and publish national comprehensive CAC emissions' inventories on a five-year cycle.

In 2001, the federal government launched the *Interim Plan 2001 on Particulate Matter and Ozone*, which included the commitment to expand the NPRI to collect information on emissions of CACs annually, beginning with the 2002 calendar year.

During 2001, Environment Canada consulted with stakeholders, including a discussion on the proposed requirements for reporting CACs to the NPRI for the 2002 reporting year. These consultations involved industry, environmental non-government organizations (ENGOs), other federal government departments and provinces/territories. Details of the NPRI consultations are available on the NPRI Web site.

Information on CAC emissions is required to enable governments to monitor and assess whether risk-management activities for various industrial sources of CACs are resulting in reduced emissions. The emissions' inventories are also required to perform joint Canada-United States (U.S.) reporting, analyses and source receptor modelling as required under the Ozone Annex of the Canada-U.S. Air Quality Agreement, and to meet requirements of a number of domestic and international programs.

Substances

The CACs are a new addition to the NPRI for the 2002 reporting year. Substance reports are required for seven CACs, provided their respective reporting criteria are met – oxides of nitrogen, sulphur dioxide, carbon monoxide, volatile organic compounds, total particulate matter, $PM_{2.5}$ and PM_{10}. For more detail on the intent and purpose for including these substances in the 2002 NPRI, refer to the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory*. The seven CACs and their respective CAS numbers, where available, are listed in Table 10.

TABLE 10: CRITERIA AIR CONTAMINANTS

CAS No.	CAC Substance	Substance Threshold
11104-93-1	Oxides of nitrogen (expressed as NO_2)	20 tonnes
7446-09-5	Sulphur dioxide	20 tonnes
630-08-0	Carbon monoxide	20 tonnes
*	Volatile organic compounds (VOCs)[1]	10 tonnes
*	Total particulate matter [2]	20 tonnes
*	$PM_{2.5}$ [2]	0.3 tonnes
*	PM_{10} [2]	0.5 tonnes

[1] Facilities that meet the reporting threshold for VOCs are required to report their air emissions based on the total mass of all VOC substances emitted annually.
[2] Do not include emissions from road dust.
* No single CAS No. applies to this substance.

Units

Report quantities of CACs released to air in tonnes.

Reporting Criteria

The reporting criteria for CACs are described in Figure 2. For more detailed guidance regarding CAC reporting, consult the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory*.

You now have completed Step 1 and should know whether you are required to report to the NPRI and, if so, for which substances.

Note that if your facility met the reporting criteria, you must submit a report even if on-site releases or off-site transfers for disposal or recycling of NPRI substances were zero.

Threshold calculations do not need to be reported to the NPRI. Their purpose is to determine the substance for which a facility is required to report on-site releases and transfers off site for disposal or recycling. Keep this information in your files. Persons reporting to the NPRI for 2002 are required to retain copies of all information on which their report was based, including any calculations, measurements or other data, at the facility or parent company in Canada, for three years. Refer to Step 7 for details.

If You Are Required to Report

If you have concluded that you are required to report for your facility, continue with Steps 2 through 7 to complete and submit your NPRI report. You will need a copy of the NPRI reporting software, available on the NPRI reporting software CD. Contact your regional NPRI office (listed on the inside front cover) if you have any questions.

You are legally required to submit your NPRI report and a signed Statement of Certification to your regional NPRI office, postmarked, courier-dated or e-mailed no later than **June 1, 2003**. If you do not have access to a computer, a paper reporting form can be provided by your regional NPRI office. Extra copies of the reporting package can also be ordered from your regional NPRI office. Note: Use of the paper forms frequently results in reporting errors and subsequent follow-up by Environment Canada. Use of the reporting software is strongly recommended.

If You Are Not Required to Report

If you have concluded that you are not required to report for your facility, either because it was used for an exempt activity or it did not meet all reporting criteria, advise your regional NPRI office (listed on the inside front cover) to update its records and mailing lists.

NEW for 2002 – facilities which submitted a report to the NPRI for the 2001 reporting year are legally required to notify Environment Canada that they are not required to report for the 2002 reporting year.

Step 2 – Estimate releases and transfers and collect the information required for the NPRI report

The second step is to estimate your releases and transfers and collect the information required to complete the NPRI report. This section outlines different methods and sources of information available to assist you in estimating releases and transfers of NPRI substances for which you are required to report.

Note that the reporting criteria for Part 1A and 1B NPRI substances apply to manufacture, process or other use activities. **However, it is the quantity of releases and transfers of the substance that must be reported to the NPRI.**

The 2002 *Canada Gazette* notice states that the information required by the NPRI need only be reported to the Minister of the Environment if the facility owner or operator possesses the information or may reasonably be expected to have access to the information. **Consequently, the NPRI does not require additional monitoring or measurement of the quantities or concentration of substances released to the environment, beyond those already required under the provisions of other laws or regulations.** You are, however, required to show "due diligence" in obtaining the information required by the 2002 *Canada Gazette* notice.

Retain Information Collected

Persons reporting to the NPRI for 2002 are required to retain copies of all information upon which their report was based, at the facility or parent company in Canada, for three years. Refer to Step 7 for details.

Sources of Information

Technical Guides

The References and Bibliography section contains a list of technical guidance documents that can be consulted for technical information on certain substances or processes. This includes technical guides prepared by Environment Canada, the U.S. Environmental Protection Agency (EPA) and industry associations.

Environment Canada has prepared guidance documents for CAC reporting and the wastewater sector. The *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory* assists facilities with estimating their CAC releases to air, while the *National Pollutant Release Inventory Guidance Manual for the Wastewater Sector* helps wastewater collection facilities estimate on-site releases and off-site transfers for NPRI substances commonly released by this sector.

In addition, Environment Canada has published a technical guide to assist facilities in the wood-preservation sector estimate their releases of certain substances. The document, *Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory*, provides a step-by-step methodology for estimating releases and transfers of NPRI substances from wood-preservation facilities, including PAHs, dioxins/furans and HCB. As a result of the significant changes made to the NPRI for 2002, in addition to consulting the wood-preservation guide, wood preservers should also consult this Guide and the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory* to ensure complete reporting of all NPRI substances.

These guides are available on the NPRI reporting software CD and are posted on the NPRI Web site <www.ec.gc.ca/pdb/npri/> in electronic form. They are also available in hard copy from your regional NPRI office.

Material Safety Data Sheet (MSDS)

A Material Safety Data Sheet (MSDS) is an important source of information on the composition of a purchased product. Suppliers of hazardous materials are required, as part of the Workplace Hazardous Materials Information System (WHMIS), to supply MSDSs on request.

Factor Information Retrieval Database

The U.S. EPA's Factor Information REtrieval (FIRE) database contains emission factors for a number of NPRI substances including, but not limited to, CACs, mercury (and its compounds), individual PAHs, dioxins/furans and HCB. The database is further explained in Appendix 12.

If you are a member of a regional or national industrial association, you may also have access to emission factors, guidance and other calculation tools through that organization.

Permits and Certificates of Approval

Another source of information on substances at your facility may be municipal, provincial, territorial or regional operating permits and certificates of approval you have obtained.

Method Detection Limit (MDL)

There are several situations in which the issue of measurements below the detection limit, or method detection limit (MDL), arises in NPRI reporting. The MDL is the smallest concentration of the substance under analysis (analyte) that produces an instrumental response and that meets all analyte detection and identification criteria of a specified test method.

Dealing with Multiple Data Points and Non-detected Values

Facilities must use reasonable judgment as to the presence and amount of an NPRI-listed substance based on the best readily-available information. An indication that a reportable substance is below the MDL is not equivalent to stating that the substance is not present. If it is known that the substance is present, a concentration equivalent to half of the MDL should be used. Persons at a facility should not estimate releases solely on measurement or monitoring devices; they should also rely on their knowledge of specific conditions at the facility.

Where, during the year, multiple measurements of a substance in a given process stream are all below the MDL, and the facility has no other reason to believe that the substance is present, the facility should assume that the concentration of the substance in that process stream is zero.

Where, over a year, multiple measurements are taken in a given process stream and some indicate that the substance is above and some are below the MDL, the facility has good reason to assume that the substance is present. The facility should, therefore, use a concentration value of half the MDL for those measurements where the concentration was below the MDL.

Methods of Estimation

Estimates of the quantity of a substance that was manufactured, processed or otherwise used, and the quantity that was released on site or transferred off site, may be based on one of the following methods:

- monitoring or direct measurements (Code M in reporting software)
- mass balance calculations (Code C)
- emission factors (Code E), or
- engineering estimates (Code O).

When you report on-site releases to each environmental medium and off-site transfers for disposal or recycling, you will enter a "Basis of Estimate" code in the NPRI reporting software. A description of the available estimation methods is provided below and in Step 5; examples employing each of the estimation methods are provided in Appendices 6 and 7.

Direct Measurement

Continuous Emission Monitoring Systems (CEMS)

A Continuous Emission Monitoring System records emissions/releases over an extended and uninterrupted period. Various methods are employed to measure the concentration of contaminants in the effluent or gas stream. Once the contaminant concentration and the flow rate have been determined, release or emission rates can be calculated

by multiplying the contaminant concentration by the discharge flow rate or volumetric stack gas flow rate. Annual releases of the contaminant can then be estimated by multiplying the contaminant concentration by the annual flow rate of the discharged effluent or gases in the stack or duct.

Predictive Emission Monitoring (PEM)

Predictive Emission Monitoring is based on developing a correlation between contaminant release/emission rates and process parameters (e.g., fuel usage, steam production or furnace temperature). PEM may be considered a hybrid of continuous monitoring, emission factors and stack tests. A correlation test must first be performed to develop the relationship between contaminant emission rates and process parameters. Releases/emissions can then be calculated or predicted using process parameters to predict release/emission rates based on the results of the initial source test.

Source Testing

Source sampling provides a "snapshot" of source emissions during the test period for air releases. Generally a sampling probe is inserted into the stack or duct and a volume of exhaust effluent is collected isokinetically, such that contaminants are collected in or on various media and subsequently analyzed. For liquid effluents, grab samples or 24-hour composite samples are extracted from the effluent stream. Emission or release rates are then determined by multiplying the contaminant concentration by the volumetric flow rate. The emission loading is subsequently calculated from these emission rates and the total period of operation.

Source testing is often conducted as a regulatory requirement for provincial, territorial or regional authorities.

Mass Balance

Mass balances apply the law of conservation of mass to a facility, process or piece of equipment. If there is no accumulation, then all the materials that go into the system must come out. Releases are determined from the difference in the input and output of a unit operation where the accumulation and depletion of a substance are included in the calculations.

The general equation for a mass balance is:

$$M_{in} = M_{out} + M_{accumulated/depleted}$$

Where:

M_{in} = Mass of compound in the raw material feed

M_{out} = Mass of compound in the finished product and released to air, land and water

($M_{out} = M_{product} + M_{emitted}$)

$M_{accumulated/depleted}$ = Mass of compound accumulated or depleted in the system

The reliability of release estimates based on mass balances are dependent on the source type considered. Mass balance methods may be a preferred method for some releases, such as solvent loss from coating applications and solvent use. This method may not be suitable for many other sources, such as in cases where chemical transformation of the input streams occurs in the process.

Mass balance methods may or may not account for emission controls, depending on the system, process or operation to which the mass balance is applied. Care should be taken to ensure that pollution-control equipment is taken into account when performing mass balance calculations.

Emission Factors

Emission factors are available for many emission source categories and are generally based on the results of source sampling tests performed at one or more facilities within a specific industry. Generally, emission factors relate the quantity of substances emitted from a source to some common activity associated with those emissions. Emission factors have been published by government agencies and industry associations for application to emission sources in their particular jurisdiction or industry sector. Industrial facilities may also develop their own site-specific emission factors using emission testing data and source activity information. For a particular piece of equipment, specified emission factors may be available from the manufacturer or sales centre.

The basic equations to determine emissions from emission factors are as follows:

$$E_x = BQ \times CEF_x \quad \text{or} \quad E_x = BQ \times EF_x \times \frac{100 - CE_x}{100}$$

Where:

E_x = Emission of contaminant x, kg
BQ = Activity rate or base quantity (BQ), base quantity unit
CEF_x = Controlled emission factors of contaminant x, kg/BQ unit (value is dependent on the external control device installed)
EF_x = Uncontrolled emission factors of contaminant x, kg/BQ unit
CE_x = Overall emission control efficiency of contaminant x, %

The Factor Information REtrieval (FIRE) database is a comprehensive depository of process specific emission factors. The database is further explained in Appendix 12.

Other emission factors for NPRI substances can be located in the Locating and Estimating Documents listed in the References and Bibliography section of this Guide.

When making use of emission factors, make sure you note the units and convert if necessary.

Engineering Estimates

General

In many cases, sound engineering assessment is the most appropriate approach to determine process factors and base quantity values. Releases can be estimated from engineering principles and judgment, using knowledge of the chemical and physical processes involved, the design features of the source, and an understanding of the applicable physical and chemical laws. The reliability of these estimates depends on the complexity of the process and the level of understanding of its physical-chemical properties. To apply an engineering assessment method, there are four basic principles, which should be followed:

- review all data pertaining to the specific source and to the industrial sector in general
- use this data to provide gross approximations and refine these using sound engineering principles as data becomes available to provide more accurate estimations
- whenever possible, alternate methods of calculation should be conducted to cross-check each level of approximation, and
- employ good record keeping by documenting all related information for further emission refinement when more accurate data become available.

Emission Models

Emission estimation models, also known as emission estimation tools, are equipment-specific and may be available from process developers and designers, government agencies or others.

Emission models generally require detailed input such as equipment specifications, process and environmental conditions and other factors that affect emissions. Generally, these models also have default input parameters, such as meteorological data, which can be used when site-specific information is not available. Care should be taken to review the default data to determine their applicability to local conditions. The resulting estimates should be reviewed to ensure their accuracy.

Part 1A Substances

If the reporting criteria are met for an NPRI Part 1A substance, then **all** on-site releases and off-site transfers for that substance must be reported **regardless of the concentration or quantity**. The facility is required to submit a substance report even if on-site releases or off-site transfers are zero. You must account for total releases of Part 1A substances from your facility to each environmental medium (air, water, land and underground injection).

Examples of estimating releases and transfers are provided in Appendix 6; "Basis of Estimate" codes are explained in Step 5.

Part 1B Substances

Part 1B substances include mercury[1], cadmium[1], arsenic[1], hexavalent chromium compounds, lead[2] and tetraethyl lead. If the reporting criteria are met for a Part 1B substance according to the concentration and mass thresholds outlined in Table 5, then **all** on-site releases and off-site transfers of the Part 1B substance must be reported **regardless of the concentration or quantity**. The facility is required to submit a substance report even if on-site releases or off-site transfers are zero. You must account for total releases of Part 1B substances from your facility to each environmental medium (air, water, land and underground injection).

Examples of estimating releases and transfers of some Part 1B substances are provided in Examples 2 and 3 of Appendix 7; "Basis of Estimate" codes are explained in Step 5.

Part 2 Substances – Polycyclic Aromatic Hydrocarbons (PAHs)

With the exception of wood preservation using creosote, if your facility met the 50-kg reporting threshold for the 17 PAHs listed in Table 6, you must report on-site releases and off-site transfers **individually** for each of the 17 PAHs that were incidentally manufactured and released or transferred.

A facility used for wood preservation must submit a report for each/any of the 17 individual PAHs released on site or transferred off site from a wood-preservation process using creosote, regardless of the quantity of PAHs released or transferred or the number of hours worked by employees.

If you do not have information available to estimate releases and transfers for any of the 17 individual PAHs, the PAHs may be reported together under the listing "PAHs, total Part 2". You may report for the 17 individual PAHs, or "PAHs, total Part 2", **but not both**. If you report under the listing of "PAHs, total Part 2", indicate in the "Comments" field which substances are included in the data, if known.

You must account for total releases of the 17 PAHs from your facility to each environmental medium (air, water, land and underground injection) and transfers off site for disposal or recycling.

An example of estimating releases and transfers of PAHs is provided in Example 2 of Appendix 7; "Basis of Estimate" codes are explained in Step 5.

Part 3 Substances – Dioxins/Furans and Hexachlorobenzene (HCB)

A facility that met the criteria set out in Step 1 must provide substance reports for dioxins/furans and HCB. However, what you report for releases and transfers may differ from a typical NPRI substance report. The dioxins/furans or HCB substance report submitted to the NPRI will indicate, for on-site releases to each environmental medium and for each off-site transfer activity:

- the **quantity** released on site or transferred off site as the result of incidental manufacture during an activity listed in Tables 8 or 9
- that **directly-measured releases to a specific medium or transfers off site** were at concentrations above, equal to or below the Level of Quantification (LoQ) concentrations set out in Table 13 (this option is available only if estimates were based on direct measurements)
- that there were **no releases to a specific medium or no transfers off site**, or
- that **no information** was available on which to base an estimate.

The use of "Basis of Estimate" and "Detail" codes for Part 3 substances is explained below.

[1] and its compounds

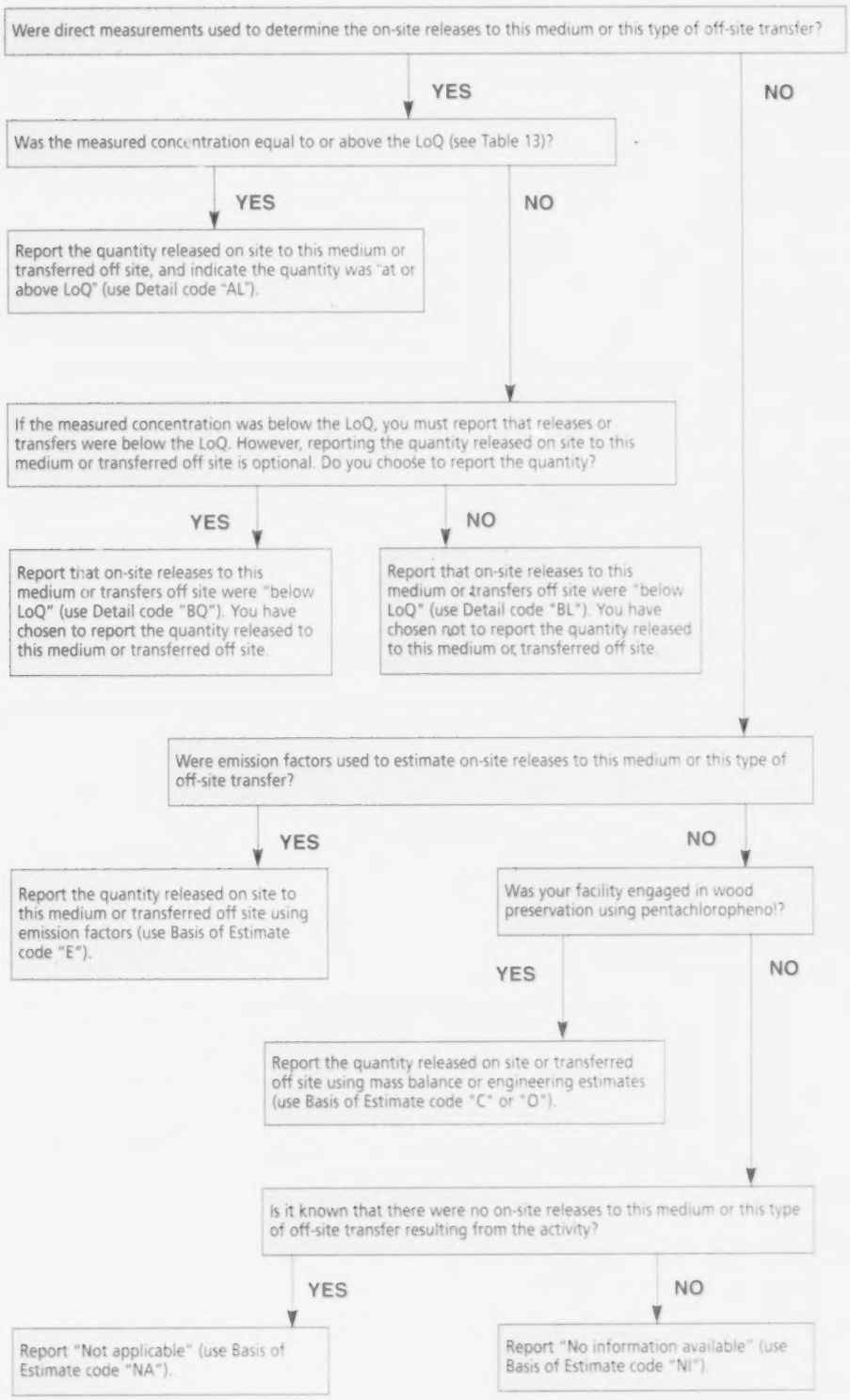
[2] and its compounds, except tetraethyl lead (CAS No. 78-00-2), does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

Determine whether you must report quantities released on site to each environmental medium and transferred off site. You must report quantities released on site and transferred off site unless:

- you directly measure dioxins/furans and HCB resulting from incidental manufacture from an activity listed in Tables 8 or 9, and the concentrations are below the LoQ values as defined below, or
- you have no information available on which to base estimates of on-site releases and off-site transfers.

Use the flowchart in Figure 7 to determine what you must report to the NPRI for dioxins/furans and HCB. Read the flowchart for on-site releases to each environmental medium (i.e., air, water, land and underground injection) and for each type of off-site transfer. You must account for total releases of dioxins/furans and HCB from your facility to each environmental medium.

FIGURE 7: WHAT YOU MUST REPORT FOR DIOXINS/FURANS AND HCB


Were direct measurements used to determine the on-site releases to this medium or this type of off-site transfer?
YES
NO
Was the measured concentration equal to or above the LoQ (see Table 13)?
YES
NO
Report the quantity released on site to this medium or transferred off site, and indicate the quantity was "at or above LoQ" (use Detail code "AL").
If the measured concentration was below the LoQ, you must report that releases or transfers were below the LoQ. However, reporting the quantity released on site to this medium or transferred off site is optional. Do you choose to report the quantity?
YES
NO
Report that on-site releases to this medium or transfers off site were "below LoQ" (use Detail code "BQ"). You have chosen to report the quantity released to this medium or transferred off site.
Report that on-site releases to this medium or transfers off site were "below LoQ" (use Detail code "BL"). You have chosen not to report the quantity released to this medium or transferred off site.
Were emission factors used to estimate on-site releases to this medium or this type of off-site transfer?
YES
NO
Report the quantity released on site to this medium or transferred off site using emission factors (use Basis of Estimate code "E").
Was your facility engaged in wood preservation using pentachlorophenol?
YES
NO
Report the quantity released on site or transferred off site using mass balance or engineering estimates (use Basis of Estimate code "C" or "O").
Is it known that there were no on-site releases to this medium or this type of off-site transfer resulting from the activity?
YES
NO
Report "Not applicable" (use Basis of Estimate code "NA").
Report "No information available" (use Basis of Estimate code "NI").

What Are Toxic Equivalents (TEQs) of Dioxins/Furans?

You must report on-site releases and off-site transfers of dioxins/furans in units of grams TEQ of the 17 congeners listed in Table 7. Dioxins and furans are often found in complex mixtures, typically at extremely low concentrations, making it difficult to determine the cumulative toxicity of the mixture. Accordingly, scientists have assigned toxic equivalency factors (TEFs) to each dioxin/furan congener as weighting factors. These TEFs are assigned relative to the toxicity of 2,3,7,8-TCDD, the most toxic congener, which is assigned a TEF of 1.

To apply and compare TEQs, the values must be calculated using the same set of TEFs. Most release data on dioxins/furans currently available in Canada are in units of international toxic equivalents (TEQs) (North Atlantic Treaty Organization/Committee on the Challenges of Modern Society, NATO/CCMS, 1989). More recent work undertaken for the World Health Organization (van den Berg, 1998) has resulted in a revised set of TEFs, not just for humans, but for mammals, fish and birds. However, since most of the emission factors currently available are in international TEQs, the TEF values listed in Table 11 must be used for reporting to the NPRI.

To calculate the TEQ of a mixture, you must first multiply the concentration of an individual congener by its respective TEF, or weighting factor, to obtain the congener-specific TEQ concentration. The sum of the TEQ concentrations for the individual congeners is the TEQ concentration for the mixture.

TABLE 11: TOXIC EQUIVALENCY FACTOR (TEF) VALUES FOR DIOXINS AND FURANS

CAS No.	Congener	Abbreviation	TEF
	Dioxins		
1746-01-6	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin	2,3,7,8-TCDD	1
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin	1,2,3,7,8-PeCDD	0.5
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	1,2,3,4,7,8-HxCDD	0.1
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	1,2,3,6,7,8-HxCDD	0.1
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin	1,2,3,7,8,9-HxCDD	0.1
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	1,2,3,4,6,7,8-HpCDD	0.01
3268-87-9	Octachlorodibenzo-*p*-dioxin	OCDD	0.001
	Furans		
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	2,3,7,8-TCDF	0.1
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2,3,4,7,8-PeCDF	0.5
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1,2,3,7,8-PeCDF	0.05
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1,2,3,4,7,8-HxCDF	0.1
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	1,2,3,7,8,9-HxCDF	0.1
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1,2,3,6,7,8-HxCDF	0.1
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	2,3,4,6,7,8-HxCDF	0.1
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,4,6,7,8-HpCDF	0.01
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2,3,4,7,8,9-HpCDF	0.01
39001-02-0	Octachlorodibenzofuran	OCDF	0.001

(NATO/CCMS, 1989)

Example of a TEQ Calculation

The following table shows the different concentrations of four dioxin and furan congeners in an ash sample. If these concentrations were simply summed together, the sample would be reported as containing 80 nanograms (ng) of dioxins/furans in each kilogram (kg) of ash. However, 1,2,3,4,7,8-HxCDF is 10 times less toxic than 2,3,7,8-TCDD. By applying the TEFs to each congener and summing the values, the resulting toxic equivalent (TEQ) for the mixture is 25 ng TEQ of dioxins/furans in each kg of ash, or 25 ng TEQ/kg.

DIOXINS/FURANS CONGENER	SAMPLE CONCENTRATION (ng/kg)	TOXIC EQUIVALENCY FACTOR (TEF)	TOXIC EQUIVALENT (ng TEQ/kg ash)
2,3,7,8-TCDD	10	1	10
1,2,3,7,8-PeCDD	20	0.5	10
1,2,3,4,7,8-HxCDF	30	0.1	3
1,2,3,6,7,8-HxCDF	20	0.1	2
Total Concentration			***25 ng TEQ/kg***

Methods of Estimation

"Basis of Estimate" Codes

When you report on-site releases to each environmental medium and off-site transfers for disposal or recycling, you will enter a "Basis of Estimate" code in the NPRI reporting software. There are four methods of estimating releases:

- monitoring or direct measurement (Code M)
- mass balance (Code C)
- emission factors (Code E)
- engineering estimates (Code O)

In addition to the codes above, two additional basis of estimate codes are available:

- no information available (Code NI)
- not applicable (Code NA)

The "NI" code is only available for dioxins/furans and HCB. Select "NI" as your "Basis of Estimate" code if your facility met reporting criteria for dioxins/furans or HCB, but you have no information available on which to base an estimate of the quantity released or transferred. If you report "NI" for an activity for which an emission factor is available in the FIRE database, state your reason for not using the provided emission factor in the "Comments" field of the NPRI reporting software.

Selecting Code "NA" (Not applicable) as the "Basis of Estimate" indicates that there were no releases from your facility to this medium, or no transfers off site.

"Detail" Codes

For dioxins/furans and HCB substance reports only, a "Detail" code field is available in the NPRI reporting software adjacent to the "Basis of Estimate" field. There are three "Detail" codes:

- concentrations at or above LoQ (Code AL)
- concentrations below LoQ (no quantity entered) (Code BL), and
- concentrations below LoQ (enter a quantity) (Code BQ).

These "Detail" codes only apply to data from monitoring or direct measurements (Code "M" in the "Basis of Estimate" field). If you enter the "AL" Detail code, you must enter the quantities released or transferred. If your concentrations were below LoQ, then reporting of quantities released or transferred is optional – you must select one of two Detail codes. If you enter the "BL" Detail code for concentrations below LoQ, you have chosen not to report the quantities released or transferred. If you enter the "BQ" Detail code for concentrations below LoQ, you have chosen to report the quantities released or transferred.

The use of "Basis of Estimate" and "Detail" codes is further explained in the following sections and summarized in Table 12.

TABLE 12: HOW TO REPORT RELEASES AND TRANSFERS OF DIOXINS/FURANS AND HCB

Basis of Estimate Code	Detail Code	Quantity Field
Monitoring or Direct Measurement (Code M)	At or above LoQ (Code AL)	you must enter **quantity** released or transferred
Monitoring or Direct Measurement (Code M)	Below LoQ (**no quantity** entered) (Code BL)	n/a
Monitoring or Direct Measurement (Code M)	Below LoQ (**quantity** entered) (Code BQ)	you must enter **quantity** released or transferred
Mass Balance (Code C)	n/a	you must enter **quantity** released or transferred
Emission Factors (Code E)	n/a	you must enter **quantity** released or transferred
Engineering Estimate (Code O)	n/a	you must enter **quantity** released or transferred
No Information Available (Code NI)	n/a	n/a
Not Applicable (Code NA)	n/a	n/a

Direct Measurements

A direct measurement is based on measured concentrations of the substance in a waste stream and the volume/flow rate of that stream. Direct measurements should be made of on-site releases and off-site transfers representative of the facility's normal operating conditions or production levels.

If your facility has made direct measurements of dioxins/furans or HCB, then you should use these data to determine which releases and transfers, if any, you must report to the NPRI. Enter Code "M" in the "Basis of Estimate" field in the NPRI reporting software. Examples of how to estimate releases using measured data are provided in Appendix 7.

The following sections will help you determine if your measured concentrations are above, equal to or below the LoQ for each type of material that you release on site and transfer off site.

Level of Quantification (LoQ)

The level of quantification is defined in Section 65.1 of the CEPA 1999, as "the lowest concentration that can be accurately measured using sensitive but routine sampling and analytical methods". Environment Canada determines LoQ values by carrying out statistical analyses of several sets of measurements from a variety of emission sources. The LoQ is calculated as 10 times the standard deviation of replicated measurements (ASTM, 2002). The standard deviation is the variability of the test data associated with the sampling, analysis and actual source emission changes during testing, using standard test methods.

Table 13 provides estimated LoQs for dioxins/furans and HCB for three types of material or waste streams that may be released on site or transferred off site – gaseous, liquid and solid. The LoQ values listed include both final and draft values published by Environment Canada. You must compare your measured concentrations to the appropriate LoQ for each type of on-site release and off-site transfer that you report to the NPRI. Containment in an off-site landfill is an example of a type of off-site transfer for disposal. Recovery of pollution-abatement residues is an example of a type of off-site transfer for recycling.

Environment Canada has published estimated LoQ values for dioxin/furan and HCB concentrations in gaseous releases (Environment Canada, 1999). You should use these values to determine whether concentrations in releases to air from stacks and other sources are above, equal to or below the LoQ.

TABLE 13: ESTIMATED LOQ VALUES FOR CONCENTRATIONS OF DIOXINS/FURANS AND HCB

State of Material	Estimated LoQ for Concentrations of Dioxins/Furans	Estimated LoQ for Concentrations of HCB
Gaseous	32 pg TEQ/m^3	6 ng/m^3
Liquid	20 pg TEQ/L	70 ng/L
Solid	9 pg TEQ/g	2 ng/g

While Environment Canada has not published an LoQ for dioxin/furan concentrations in liquids, it has extrapolated a draft LoQ for dioxins/furans in liquids from the effective LoQ for 2,3,7,8-TCDD in the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations*. Facilities should use 20 pg TEQ/L as the LoQ for concentrations of dioxins/furans in liquids.

Environment Canada has developed an estimated LoQ for concentrations of HCB in chlorinated solvents (Environment Canada, 1997). Facilities should use 70 ng/L as the estimated LoQ for concentrations of HCB in all liquids.

Environment Canada published proposed LoQ values for dioxins/furans and HCB in soil in early 2000 (Environment Canada, 2000). You should use LoQ values of 9 pg TEQ/g for dioxins/furans and 2 ng/g for HCB to determine whether concentrations of dioxins/furans or HCB in solid materials are equal to or above the LoQ. Incinerator bottom ash, pollution-abatement residues and sludges are examples of solid materials containing dioxins/furans or HCB that may be released on site or transferred off site.

Are Your Measured Concentrations Equal to or Above LoQ?

When comparing measured concentrations to LoQ values, measurements should be made of on-site releases and off-site transfers representative of your facility's normal operating conditions or production levels. If you determine that your measured concentrations are equal to or above the LoQ, then you must estimate and report the quantities of on-site releases and off-site transfers for the 2002 calendar year using these concentrations. Enter Code "AL" (At or above LoQ) in the "Detail" code field in the NPRI reporting software.

Are Your Measured Concentrations Below LoQ?

When comparing measured concentrations to LoQ values, measurements should be made of on-site releases and off-site transfers representative of your facility's normal operating conditions or production levels. If you directly measure dioxins/furans and HCB in an on-site release or off-site transfer resulting from incidental manufacture from an activity listed in Tables 8 or 9, and the concentrations are below LoQ, reporting the quantities released on site and transferred off site is optional. You must select one of two Detail codes. If you enter Code "BL" for concentrations below LoQ, you are not required to enter the quantities released or transferred. If you enter Code "BQ" for concentrations below LoQ, you have chosen to report the quantities released or transferred.

Example

A facility has directly measured dioxins/furans resulting from incineration of non-hazardous solid waste (incidental manufacture of dioxins/furans from an activity listed in Table 8). The facility determined that dioxins/furans were released to air from a stack at a concentration of 20 pg TEQ/m^3 . The measured concentration is below the LoQ of 32 pg TEQ/m^3, so the facility does not need to report the quantities of dioxins/furans released on site from stacks. The facility will report that releases to air of dioxins/furans from the stack are below LoQ (Detail code "BL").

Dealing with Multiple Data Points and Non-detected Values

If you have several sets of directly-measured concentrations for a given release or transfer, you should compare the average or mean value of all the concentrations with the appropriate LoQ (see the Method Detection Limit section earlier in this Step for more guidance on how to calculate a mean concentration when you have multiple data points and non-detected values). Once you have calculated the mean concentration of all the measured values, use this concentration to calculate the quantities of dioxins/furans and HCB released on site or transferred off site.

Emission Factors

An emission factor is based on average measured emissions from several similar processes. Emission factors usually express releases as a ratio of quantity released to process or equipment throughput. In the absence of data from direct measurements, your facility should estimate on-site releases or off-site transfers of dioxins/furans or HCB as a result of incidental manufacture, using emission factors that you possess or to which you have reasonable access. Enter Code "E" in the "Basis of Estimate" field in the NPRI reporting software.

Emission factors may be developed for one or more facilities using measured data under similar process conditions. Many emission factors for activities in Tables 8 and 9 are compiled in the FIRE database (see Appendix 12). You should indicate, in the "Comments" field of the NPRI reporting software, the source of any emission factor used. If an emission factor for your activity is available in the FIRE database, but you choose not to use it, you should provide your reason in the "Comments" field.

If you use emission factors to estimate on-site releases and off-site transfers, you must report the quantities released or transferred. You cannot report that your concentrations for a specific on-site release or off-site transfer are below the LoQ.

No Information Available

If information is not available for releases to a specific medium or for an off-site transfer, either through direct measurements, emission factors or some other source to which the facility possesses or may reasonably be expected to have access, then the facility should report "No information available" for on-site releases to that medium or for that type of off-site transfer. Enter Code "NI" in the "Basis of Estimate" field in the NPRI reporting software. If you report "No information available" for an activity for which an emission factor is available in the FIRE database, you should provide your reason for not using the values in the emission factor database in the "Comments" field of the NPRI reporting software.

No On-site Releases to a Specific Medium or Transfers Off Site

If there were no dioxins/furans or HCB released on site to a given medium or transferred off site from the facility for the specified activity, the facility should report "Not applicable" for that medium or transfer category for that substance. Enter Code "NA" in the "Basis of Estimate" field in the NPRI reporting software, indicating that there were no releases to the given medium or transfers off site for that category.

For example, if dioxins/furans were only released to air from a combustion process of an activity listed in Tables 8 or 9, and there was no related process with releases to water as a result of that activity, the facility reports "Not applicable" for on-site releases of dioxins/furans to water.

Part 4 Substances – Criteria Air Contaminants (CACs)

Detailed guidance regarding CAC release estimation is provided in the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory.*

You now have completed Step 2 and should be ready to install the NPRI reporting software. Proceed to Step 3.

Step 3 – Install the reporting software and upload data

Step 3 describes how to install and open the NPRI reporting software. Details of how to check for errors and export data once you have completed your report are provided in Steps 6 and 7 of this Guide.

You are encouraged to install and open the NPRI reporting software **when you receive it** to ensure that you do not have any technical difficulties that may result in late submission of your report. If you have questions about the reporting form or software, refer to this Guide or use the "Help" button in the bottom left-hand corner of each screen. Alternatively, "Help" can be obtained by pressing the F1 key.

If you reported to the NPRI for 2001, you can upload the data from that report and update the information (see "Import Data / Maintain System").

The four components of this step are:

1. Install the software – see description of system requirements and installation procedure below.
2. Open the software and familiarize yourself with the various screens and functions.
3. Select inventory program - see description below.
4. Import data (optional) – use this function if you want to upload an NPRI report from 2001 or a 2002 report from another facility (see "Import Data / Maintain System").

Install and Open/Start the NPRI Reporting Software

Hardware and Software Requirements

The Windows-based reporting software is a 32-bit application that can only be used on computers running Microsoft Windows. The minimum requirements for using the electronic reporting form are:

- Intel Pentium II compatible personal computer
- Windows 9x (includes 95, 98, SE, ME) or Windows NT (includes 2000 and XP - may also require Administrative Privilege to install)
- Microsoft Internet Explorer version 4 with service pack 5 (or higher) installed (IE5+ is recommended)
- CD-ROM drive or Internet access
- Hard disk drive with 50 megabytes (Mb) or more of available space
- Microsoft Data Access Components (MDAC) 2.6 (or higher) installed (recommended)

Environment Canada has initiated a software installation helpdesk. If you are having difficulty installing and running the NPRI software, contact:

E-mail: nprihelpdesk@ec.gc.ca
Tel.: (819) 994-1672
1-877-877-8375 (toll-free)

NOTE: Installation related problems represent a large proportion of the calls received by Environment Canada. It is strongly recommended that the software be installed as soon as it is received or downloaded and then tested to ensure successful installation. This will provide sufficient time for resolution of any problems and allow adequate time to complete the NPRI report by the June 1, 2003, deadline.

Questions regarding completing and submitting NPRI reports should be directed to your regional NPRI office (listed on the inside front cover of this Guide).

Install the NPRI Reporting Software

- Start Windows.
- Insert the NPRI CD into your CD-ROM drive. The NPRI CD browser will automatically launch if Autorun is enabled on your system. Follow the on-screen instructions. To install the NPRI reporting software, select "Install Reporting Software". This will start the installation process.
- If the NPRI CD browser does not appear, open the Windows/NT Explorer, select the CD-ROM drive, change to the directory "Software" and double-click on the file NPRI2002Setup.exe.

Information is available on this CD to assist you in submitting your report; be sure to browse it after successful installation.

If downloading from the Internet, go to <www.ec.gc.ca/pdb/npri> and locate the download location of the 2002 reporting software. Download the file **NPRI2002Setup.exe** (approximately 25 Mb in size) to a directory on your hard drive and then double-click this file.

- Follow the installation instructions*.

Open the NPRI Reporting Software

To open the NPRI reporting software, use one of the following three methods:

- Double-click on the NPRI-INRP icon on your desktop
- Go to… **Start, Programs, NPRI-INRP, 2002**, and click on **2002 Reporting Software**, or
- Open the Windows Explorer, select the drive and directory in which the software was installed, and double-click on **NPRI_Win.exe**.

Using the NPRI Reporting Software

Opening Screens

When you first open the software, select your preferred working language – French or English.

Selection of Inventory Program

The 2002 NPRI reporting software includes the annual reporting forms for Environment Canada programs (NPRI, ARET 2 and Environmental Performance Agreements), Ontario Regulation 127/01 (O.Reg.127/01), Alberta Environment (AENV) Approvals Reporting, and the National Emissions Reduction Masterplan (NERM) of the Canadian Chemical Producers' Association. These programs are further defined below. At the outset, you must select all of the inventory program(s) to which you intend to report through the "Selection of Inventory Program" screen. Company coordinators must be cognizant of all the programs to which their respective facilities will report and make these selections before importing any individual facility reports.

Warning: Once an inventory program has been selected and data has been entered, do not attempt to remove an inventory program globally through this screen. This may result in errors when you generate an export file. You will be given an opportunity to deselect non-applicable programs on a substance-by-substance basis later (see field B1.5).

○ **NPRI - National Pollutant Release Inventory**

- Facilities required to report to Environment Canada for the NPRI

* The installation process will check for the presence of two system components provided by Microsoft. If your system is missing one or both of these components, the installation program will install them (Windows Installer v2.0 and Microsoft Data Access Components (MDAC) v2.6). This may result in your system restarting once or twice. It is possible that the installation process may not restart correctly, in which case you will need to manually restart the installation process as previously described.

Select this option if you are required to report to Environment Canada under the NPRI. If you are completing an NPRI report for multiple facilities, only some of which are in Ontario, you should also select the "ON MOE" option.

○ **ARET 2 - Voluntary Pollution Reduction Program**

- Facilities that have committed to reporting on their ARET 2 Action Plans

Select this option if you are reporting to the ARET 2 program. By selecting to report to ARET 2, you will be able to report your facility's annual progress and update milestones, as appropriate, on the substance reductions committed to in your ARET 2 Action Plan.

ARET 2 is Environment Canada's flagship voluntary initiative program. ARET 2 applies to facilities that have submitted an Action Plan and negotiated targets and milestones with Environment Canada for one or more substances on the ARET 2 list. For further information about the ARET 2 program, contact the ARET Secretariat at (819) 997-8952.

Reporting to ARET 2 is similar to reporting to the NPRI. Refer to this Guide for a description of each field in the reporting form.

○ **EPA - Environmental Performance Agreements**

- Facilities required to report to Environment Canada under an EPA(s)

Select this option if you are reporting to Environment Canada under an Environmental Performance Agreement (EPA). EPAs are non-legislative agreements, which meet core design criteria, and have been negotiated among parties to achieve specific environmental results.

By selecting to report under an EPA, you will be able to report emissions information required by your agreement. Substances and specific data fields that must be reported may vary, depending on the EPA. All EPA reporting requirements may not be met through this software. Individual EPAs may require other forms of monitoring, such as case studies. Refer to the EPA to which you are a signatory for specific reporting requirements.

Environmental Performance Agreement (EPA) Identification

If you have selected to report under an EPA, you must identify under which EPA(s) you will be reporting.

After selecting to report under an EPA, you will be presented with a screen that will enable you to select an agreement from a list of EPAs known to exist when the software was created. To select an EPA, click the "Add" button to open the "Master Pick-list of Environmental Performance Agreements" table. From this pick-list, select the EPA under which you will be reporting. If you cannot find the name of the EPA under which you are reporting, you can add a new entry by selecting "Other" from the pick-list. By selecting "Other", you will be automatically prompted to provide a short description of the EPA under which you are reporting. Provide a description that clearly identifies the EPA. Repeat this process for each EPA you wish to report.

○ **ON MOE - O.Reg.127/01 - Ontario Regulation 127/01**

- Ontario facilities required to report to the Ontario Ministry of the Environment (ON MOE) under O.Reg.127/01

Select this option if you are required to submit an annual report to the ON MOE under O.Reg.127/01.

If you are required to report for any substances listed in Table 2C of O.Reg.127/01, you must also report those substances to the NPRI. In this case, select the "NPRI" option as described above.

Refer to the Help file or the *Guide for Reporting under O.Reg.127/01 Using the NPRI Software – 2002* for descriptions of the fields in the O.Reg.127/01 reporting form.

○ **NERM - National Emissions Reduction Masterplan**

– Facilities required to report to the Canadian Chemical Producers' Association (CCPA) for NERM

Select this option if you are reporting to NERM. NERM is an emissions reporting and reduction initiative of the CCPA. A component of Responsible Care®, NERM applies to all chemical manufacturing facilities operated by CCPA-member companies. For further information, contact the CCPA at 613-237-6215 ext. 237.

The NERM reporting form is similar to the NPRI reporting form. Refer to this Guide for a description of each field in the reporting form. A summary of the changes to the NERM substance list for 2002 is included on the NPRI reporting software CD.

○ **AENV - Alberta Environment Approvals Reporting**

– Facilities required to report to Alberta Environment (AENV) for Criteria Air Contaminants under the Alberta Environmental Protection and Enhancement Act (EPEA)

Select this option if you are required to submit emission information for Criteria Air Contaminants to support your Alberta EPEA approval(s). A separate guidance document for reporting under Alberta Approvals using the 2002 NPRI software is available.

Main Menu

The NPRI reporting software uses a menu-based system for navigation. The "Main Menu" is the starting point for completing an NPRI report. A typical procedure is to first select "Import Data/Maintain System Files" and upload the data from your 2001 report, or to load the data from another 2002 reporting facility. Next, choose "View / Enter / Edit Data" and update information on reporting facilities, substances and off-site facilities. *It is particularly important that you do this when you import a previous year's report as not all data is uploaded.* Finally, choose "Check Errors / Create Export" to check if your report contains any errors and to export an NPRI report to diskette or a directory (folder) on your hard drive for submission with a signed Statement of Certification to your regional NPRI office. Note that the "Change Inventory Program Selection" option should only be used if you need to change your original program selection.

MAIN MENU

- Import Data / Maintain System Files
- View / Enter / Edit Data
- Check Errors / Create Export
- Print Menu
- Change Inventory Program Selection
- << Change Directory >>

<< Change Directory >>

This feature allows you to change the default directory where the software will store your data. This permits you to store one or more data reports in their own subdirectory on your system. This feature is useful for consultants who

prepare reports for different clients or for company coordinators reporting for several facilities. Note that independent contractors (consultants) submitting reports for different companies must submit a separate report for each of their clients.

To use this feature, first use Windows Explorer to create a new folder (or data directory). Then use the NPRI software to change to the location of the data directory created. The software will create a new empty database in the folder selected or it will open an existing database if one is present.

Note: This function cannot be used to copy NPRI reports from one folder to another. You must use Windows Explorer to manually copy the NPRIDATA.MDB database file from one directory to another and then use the above steps to change the default data directory. Also, the software can only open a database created for the current reporting year.

Import Data / Maintain System Files

IMPORT DATA / MAINTAIN SYSTEM FILES

- Import Data
- Clear Database Tables

Importing Data

You may only import your data from the 2001 or 2002 reporting years that are stored on a hard drive (including network drives) or on floppy disks. If you import data, you are required to update the facility and substance information where required, verify that all information is accurate and complete the fields that were not imported.

Data reports from other facilities can also be uploaded. This feature is useful for company coordinators who wish to combine reports from several facilities into one report.

To use this feature, go to the "Main Menu" and select the "Import Data / Maintain System Files" option, followed by the "Import Data" button. When prompted, choose the drive letter and directory name of the appropriate data file. For 2001, if you installed the reporting software in the default directory, choose the **ExpoData.mdb** file found in either of the following directories:

- C:\Program Files\NPRI-INRP\2001\Exports\NPRIData, or
- C:\Program Files\NPRI-INRP\2001\Exports \X2CCData

If you exported your file to a diskette, use it as the source for your import file.

For the current year, choose the **Expo_All.mdb** file found in the following directory:

- C:\Program Files\NPRI-INRP\2001\Exports

The NPRI software can upload data from any drive or folder that contains a valid export file. A status screen will indicate the year for which the data are being uploaded (2001 or 2002) and list the number of facilities, substances and off-site facilities that will be uploaded.

While the data are being uploaded, the program will display the number of records transferred and the number of duplicates found, if any. The software will warn you if a duplicate facility is being uploaded and give you the option to:

- overwrite the existing record with the record being uploaded
- create a new facility with a different identifier (NPRI ID)
- skip and not import the record being uploaded, or
- cancel all further imports.

Clear Database Tables

This feature is designed to delete all data that are currently in the NPRIData.mdb file in the directory to which the reporting software is set (see << Change Directory >>). Once deleted, data cannot be recovered.

View / Enter / Edit Data

The software requires that you enter the identification information for a facility prior to entering substance-related information.

From the "Main Menu", select "View / Enter / Edit Data". From this screen, you can enter all the information required by the programs you previously selected. **At any time, you can save the information you have entered or abandon the changes you have made.**

VIEW / ENTER / EDIT DATA

- Default Contractor / Coordinator
- Reporting Facilities
- Substances
- Stacks (>= 50 metres)
- Surface Water Bodies
- Off-site Facilities

Default Contractor / Coordinator

You are required to identify whether there is a contractor or company coordinator completing or associated with the report being submitted. This optional section simplifies the entry of this information by providing a default that the software will use when it is required. Should you decide not to provide a default, you will need to enter this information for each reporting facility.

C1.0 Default Contractor (applies to Contractor Contact, A21.0 and A22.0)

A company or facility will often hire a contractor to complete its NPRI report. In this case, Environment Canada requires that the contact information for the contractor be provided.

If you answer "Yes" to the question in field C1.0, you will be prompted to enter the name, telephone number and address of the contractor. The C1.0 feature assists independent contractors who are submitting reports for a number of facilities owned by the same company. Information entered in C1.0 and C2.0 will be automatically entered in the fields in sections A21.0 and A22.0, respectively, so the independent contractor need only enter his/her contact information once.

C3.0 Default Company Coordinator (applies to Company Coordinator, A8.0 and A9.0)

Some companies may coordinate reports for several facilities through a central contact. If you are a company coordinator completing reports for more than one facility, you may enter your contact information here, rather than repeatedly in each facility report.

If you answer "Yes" to the question in field C3.0, provide the name, position title, e-mail address, telephone and facsimile numbers for the company coordinator (see the description for sections A8.0 and A9.0 for further details). Information entered in C3.0 and C4.0 will be automatically entered in the fields in sections A8.0 and A9.0, respectively, so the company coordinator need only enter his/her contact information once.

Note: Correspondence from Environment Canada will be addressed to the company coordinator.

Reporting Facilities

Information identifying the facility is entered in sections A1.0 to A26.0 of the "Reporting Facilities" section. The electronic reporting form allows reports for more than one facility to be entered. This is useful for company coordinators who are submitting reports for several facilities. The "Facility/Substance Summary" screen provides a concise summary of on-site releases and off-site transfers. This summary is also available immediately prior to exporting a report. Refer to Step 4 for guidance on entering facility information.

Substances

Note: You must have entered information for at least one facility before you can enter substance-related data.

Information on substances is entered in sections B1.0 to B40.0 of the "Substances" report. The substance summary screen lists the facilities and their associated substance reports. Substance reports can be added, modified and deleted. The "Facility/Substance Summary" screen provides a concise summary of on-site releases and off-site transfers. This summary is also available immediately prior to exporting an NPRI report. Refer to Step 5 for guidance on entering substance information.

The following sections describe the major pick-lists used by the software. The pick-lists can be modified or edited if they are incomplete or inaccurate.

Stacks (>= 50 metres) (CAC reporting requirement)

Note: You must have entered or imported data for at least one facility to access this pick-list.

When you select the "Stacks (>= 50 metres)" button, you will be shown the stack pick-list for the facilities you are reporting. You may add a stack or modify a previously-entered stack by selecting the "Add" or "Modify" buttons at the bottom of the screen. This will present the "Identification of Stacks (>=50 metres)" screen. Fields S2.1 to S2.8 must be completed for all stacks greater than or equal to 50 m above grade that meet stack release thresholds (see Table 14).

TABLE 14: CAC THRESHOLDS FOR IDENTIFYING AND REPORTING FOR STACKS >= 50 METRES

CAC Substance	Stack Threshold
Carbon monoxide	5 tonnes
NO_x (expressed as NO_2)	5 tonnes
Sulphur dioxide	5 tonnes
Total particulate matter	5 tonnes
Volatile organic compounds	5 tonnes
$PM_{2.5}$	0.15 tonnes
PM_{10}	0.25 tonnes

S2.1 and S2.2 Stack ID Number and Stack Name

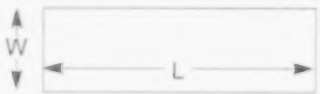
The software will assign each stack an identification number and provide a field for you to assign a name/description to the stack. This is intended to ease stack identification by the facility for current and future reporting. Environment Canada strongly recommends that facilities provide an appropriate stack name.

S2.3 Stack Height (m)

This refers to the height of the stack above grade. The height of the stack is determined by taking the measurement from ground level to the exit level of the stack. This is the same procedure used if the stack is on the top of a building. For example, if you have a 30-m stack sitting on top of a building that is 20 m tall, your total stack height is 50 m.

S2.4 Stack Diameter (m)
Report the inner diameter at the exit level of the stack. If the opening at the top of the stack is not circular, calculate and report the equivalent diameter using the following equation:

$$E_d = 2\left(\frac{L \times W}{L + W}\right)$$



Where: L = length
W = width

S2.5 Exit Velocity (m/s)
Enter the average exit velocity of the gas where it exits the stack or flare. This number is often required for an operating permit. Use the number on the permit where applicable. In the case where only the exit flow rate is known, use the following equation to convert the flow rate (i.e., m^3/s) to velocity (m/s):

$$v = \frac{\dot{V}}{A}$$

Where: v = exit velocity in m/s
$\dot{V}$ = volumetric flow rate in m^3/s
A = stack area in m^2

S2.6 Exit Temperature (°C)
Enter the average temperature of the gas when it exits the stack, or the average temperature at the top of the flame for a flare. This number is often required for an operating permit. Use the number on the permit where applicable. The equations to convert Kelvin and degrees Fahrenheit to degrees Celsius are provided below:

Fahrenheit (°F) to Celsius (°C):

$$°C = \frac{5}{9}\left[°F - 32\right]$$

Kelvin (K) to Celsius (°C):
$K = °C + 273.16$

S2.7 and S2.8 Stack Latitude and Longitude (optional)
If the latitude and longitude value of the stack is known (e.g., documented in regulatory permits or site plans), report this information in the fields provided. The required format is *degrees, minutes, seconds*. Reporting this information is not mandatory, but it is of use to regional air quality modellers who use the information collected through the NPRI for CACs.

Surface Water Bodies

Select this button to open the "Master Pick-list of Surface Water Bodies" table. The entries in this table become part of a pick-list available when completing the "Water Bodies" column of field B12.3 of the substances report.

If you are reporting the release of an NPRI substance to surface waters (streams, rivers, lakes, bays, inlets, etc.), you must identify the receiving water body. To ensure that water bodies are consistently identified, the list of names in this table was assembled from data in the NPRI and from the *Gazetteer of Canada*. The names in this initial list cannot be modified. However, if you cannot find the name of a water body, you can add a new geographic feature to the list. When adding a water body, ensure you use its proper name.

There are two ways to edit the "Master Pick-list of Surface Water Bodies" table:

- select "Surface Water Bodies" in the "View / Enter / Edit Data" menu, or
- select the button in the "# of Water Bodies" column in field B12.3 and, when presented the next screen, select "Add a new water body to the pick-list".

Once you have added a water body, you are required to report the quantity of the substance released to that water body. **Do not add a new surface water body name unless it will be associated with at least one discharge to surface waters identified in field B12.3, otherwise the software will generate an "orphan water body" error.** To correct this error, you must either identify releases to that water body or delete that water body.

Off-site Facilities

Select this button to open "Master Pick-list of Off-site Facilities". The entries in this table become part of a pick-list which is available when completing the "# of Off-sites" column of fields B22.1 and B25.1 of the substances report.

The NPRI identifies three different types of off-site facilities:

- facilities to which the reported substance is sent for final disposal or treatment prior to final disposal
- municipal sewage treatment plants (MSTPs) to which your facility discharges an **effluent** containing the reported substance, and
- facilities to which **materials** containing the reported substance are sent for **recycling**.

Discharges to sanitary sewers are reported as off-site transfers for disposal to an MSTP, regardless of the type or level of treatment offered at the MSTP.

If your facility transfers a substance off site for disposal or recycling, you must identify the receiving facility. To ensure that off-site facilities are consistently identified, a list of facilities was assembled from data reported to Environment Canada in previous years. The information for the off-site facilities in this initial list cannot be modified. However, you can add a new off-site facility to the list if you cannot find the name of the facility to which you transferred substances. Make sure you use the correct name for the off-site facility when selecting from, or adding to, the off-site facility pick-list.

There are two ways to edit the "Master Pick-list of Off-site Facilities" table:

- select "Off-site Facilities" in the "View / Enter / Edit Data" menu, or
- select the button in the "# of Off-sites" column in field B22.1 or field B25.1 and then "Add an off-site facility to the pick-list".

Once you have added an off-site facility, you are required to report the quantity of the substance transferred to that facility. **Do not identify an off-site facility unless it will be associated with at least one substance transfer, otherwise the software will generate an "orphan facility" error.** To correct this error, you must either indicate a transfer to that facility or delete the off-site facility you added.

Check Errors / Create Export

See Step 6 for a complete description of this menu item.

Print Menu

From this screen, you can set printer defaults, print all or part of a report and print a Statement of Certification for each of the programs to which you are reporting.

Note: DO NOT submit a printed copy of the report with your electronic copy. You are only required to submit the electronic copy and a signed Statement of Certification.

PRINT MENU

- Print Statement of Certification
- Print Facilities / Substances
- Print Supplementary Information
  - Print Stacks (>= 50 metres)
  - Print Surface Water Bodies
  - Print Off-site Facilities
  - Print Summary Listings
- Print Reporting Errors
- Set Printer Defaults

Print Statement of Certification

A signed and dated Statement of Certification (SoC) must be submitted with the NPRI report. *Each program-specific SoC created by the software is adjusted to reflect the information included on the electronic submission for that program.*

A brief report summary is printed as part of the SoC. It lists the facilities, their substance reports and the total quantities released on site and/or transferred off site for disposal and recycling. The SoC includes the name and address of the company official identified in sections A16.0 and A17.0.

Print Facilities / Substances

This report provides a detailed listing of all the information in a report. A series of check boxes allow you to select various options for printing. By default, the report will list all of the facilities and their substances. The off-site facilities and water bodies **must** be printed separately. You have the option of printing the facility information only, without the substance information, or printing specific sections of the facility and/or substance reports.

You may choose to print the report in the "language of entry". This allows those reports completed in English to be printed in English while reports completed in French are printed in French. Or, the report headings can be printed in either French or English; information entered in the report will remain in the language of entry. There is no requirement to print a copy of your report for submission to Environment Canada. This feature is provided for your convenience in preparing your submission or generating a hard copy of the report for your own needs.

Print Supplementary Information

Print Stacks (>= 50 metres)

This report provides a listing of all the stacks greater than or equal to 50 metres to which the facility reported the release of a CAC substance.

Print Surface Water Bodies

This report provides a listing of all surface water bodies to which the facility reported the release of a substance.

Print Off-site Facilities

This report provides a listing of all off-site facilities to which the facility reported the transfer of a substance.

Print Summary Listings

This report provides a summary of the actual and anticipated releases and transfers reported for each substance.

Print Reporting Errors

This report provides a summary of errors in the facility and substance reports which must be corrected before exporting the data.

Set Printer Defaults

You can either print to a printer ("P") or to a file ("F"). The software can use any printer on your system or you can print to a file in cases where the printer is inaccessible. The resulting file is a simple text document that can be edited in Notepad, WordPad or any other PC-based word processing program. If you are having printing problems, try using the "print to a file" option and then printing from Notepad, WordPad or your preferred word processing program.

HINT: For best results, use a fixed-pitch font such as 10-point Courier or New Courier. Reports are currently designed to produce legible output with these fonts only.

Follow Steps 4 and 5 to complete your report, then Steps 6 and 7 to export your data and submit your report to Environment Canada and/or to other selected programs.

The electronic reporting form, and Steps 4 and 5 of this Guide, are organized as follows:

Step 4:

- Section A1 Facility Identification

Step 5:

- Section B1 Substance Information
- Section B10 On-site Releases to the Environment
- Section B20 Off-site Transfers for Disposal or Recycling
- Section B30 Pollution-Prevention Activities
- Section B40 Production Ratio and Activity Index

Review the explanations provided for these sections before completing your 2002 NPRI report.

Step 4 – Enter or update the facility information

Steps 4 and 5 describe the information required and the procedures to follow to comply with the *Canada Gazette* notice for the 2002 NPRI. The electronic reporting form was developed to facilitate data input for reporters, to provide help files for the person completing the report and to reduce errors in data transcription. For ease of reference, Steps 4 and 5 follow the same order, titles and numbering system as the electronic reporting form.

NOTE: Some facilities have replaced staff who prepared earlier NPRI reports and, as a result, new staff are unaware of the requirement to report, do not receive the NPRI reporting kit when it arrives at the facility, or cannot find the electronic data and records used to prepare the previous year's report. Consequently, some facilities may submit a late or incomplete report. All facilities should establish and maintain appropriate administrative procedures to guarantee an orderly transition during staff and other corporate changes and to ensure due diligence.

If your facility is located in Ontario and you are required to report to the NPRI and the ON MOE, the software will display both the NPRI and ON MOE fields. Refer to the *Guide for Reporting under O.Reg.127/01 Using the NPRI Software – 2002* or Help file for a description of the ON MOE fields.

Facility Identification

From the "Main Menu" of the NPRI software, select the "View / Enter / Edit Data" menu and then select "Reporting Facilities". The electronic reporting form allows NPRI reports for more than one facility to be created. This is useful for company coordinators who are submitting NPRI reports for several facilities. You can add, delete or edit a facility record from the facility list. Deleting a facility will also delete all of its substance data if any has been entered.

At any time while completing the report, you can save the information entered or abandon changes made. Save work often to avoid losing data should the hardware or software fail.

A1.0 NPRI ID, Web Site Address, Dun and Bradstreet Number

The "Reporting Year" field cannot be changed. This is the calendar year for which you are required to report to the NPRI and for which you will be providing information.

A1.1 NPRI ID

If an NPRI report was previously submitted for your facility, it was assigned a **permanent** NPRI identification number. The NPRI ID is specific to the facility, at a particular location, and does not change even if ownership or the name of the facility does. You will find this number on the mailing label of the 2002 NPRI package or on correspondence sent to your company/facility. If you cannot find your NPRI ID number, call your regional NPRI office (listed inside the front cover).

If this is your first year of reporting, you must create a temporary NPRI ID for your facility. To create a temporary NPRI ID, click on the "Generate an NPRI ID" button. A permanent NPRI ID for your facility will be assigned by Environment Canada at a later date.

NOTE: A number of facilities do not report the NPRI identification number assigned to the facility. Your assigned NPRI ID number is provided in your NPRI correspondence. Valid NPRI ID numbers are between 00001 and 99999. Contact your regional NPRI office if you cannot find your ID number.

A1.2 Language

Correspondence from Environment Canada to your facility will be in the language identified in this field – English or French. The language code determines which language is used by the software when printing reports.

A1.4 Web Site Address

This is an optional field for you to provide the Web site address of your facility or parent company. The address you provide will become part of the on-line NPRI database and will allow visitors to link directly to your Web site for more information.

A1.5 Dun and Bradstreet (D-U-N-S) Number

D-U-N-S is a nine-digit number that Dun and Bradstreet uses to identify companies in its financial database. This will allow Environment Canada to identify the corporate structures relating facilities to their parent companies. A large organization is likely to have many D-U-N-S numbers, linking their various headquarters, subsidiaries, branches and facilities. Report the D-U-N-S number of the facility. This number may be available from your facility's treasurer or financial officer. If the facility doesn't have a D-U-N-S number, but the parent company does, report that number in section A3.0 "Identification of Parent Companies". If you need to verify your D-U-N-S number or obtain a new one, call the Dun and Bradstreet Customer Service Centre at 1-800-463-6362, or (905) 568-6000; Fax: (905) 568-6197. For more information, you can visit the Dun and Bradstreet Web site at <www.dnb.ca>.

A2.0 Facility Identification and Site Address

The NPRI database fully supports uppercase/lowercase text entry which improves legibility. DATA ENTRY IN ALL UPPERCASE CHARACTERS IS DISCOURAGED. Take the time to correctly enter your facility identification as you wish it to appear in the publicly-accessible database. This information will be used to identify your facility in all Environment Canada reports and data products and should therefore be selected carefully to ensure that your facility is correctly identified.

Geographic coordinates for facilities are determined by Environment Canada. Facilities may be asked to provide the information needed to determine the geographic coordinates of the facility.

A2.1 Company Name

Enter your company name. **This field is mandatory.** If your company owns more than one reporting facility, ensure that the company name is used consistently for all facilities.

A2. Facility Name

Enter the name of the facility or any other information which, in addition to the "Company Name", completely identifies the facility. You may omit the "Facility Name" if the "Company Name" alone completely identifies the facility.

COMPANY NAME	FACILITY NAME
Specialty Pharmaceuticals	Liquids Plant
Trans Canada Airlines	Calgary
Canadian Refineries	Alberta Processing Plant
International Manufacturing	ABC Manufacturing Division

A2.3 and A2.4 Street Address

The "Street Address" is the site address of the facility. **Do not use a post office box or mailing address as the street address.** A mailing address can be given when identifying a public contact, technical contact or company coordinator. Enter the street name and number and other identifiers such as suite number or building designation. For rural addresses, where a street address is not available, enter the lot and concession numbers, and the township or its equivalent.

A2.5 City/District

Enter the name of the city, town, village, district or township in which the facility is located.

A2.6 Province or Territory

Enter the name of the province or territory in which the facility is located. Choose the name or abbreviation from the pick-list that is available while the cursor is in the "Province" field.

A2.7 Postal Code

Enter the postal code. It will be formatted automatically (e.g., V7M 3H7). This field is optional for rural addresses but you are encouraged to enter one if it is available (see A2.11).

A2.11 Rural Address

Selecting "Yes" will identify the above address as a rural address.

A3.0 Identification of Parent Companies

For the purposes of the NPRI, a parent company is defined as the highest level company or group of companies that directly control your facility. If your company is not owned or controlled by another parent company, select "No" in field A3.1, "Is the facility controlled by another company or companies?" Otherwise select "Yes" in field A3.1. This opens the "Identification of Parent Companies" screen in which you can report the names, addresses and percent ownership of controlling parent companies.

The D-U-N-S number identifies the parent company and its corporate relationship to the reporting facility. Complete this field as described in A1.5.

Province, territory or U.S. state codes can be found in pick-lists available while the cursor is in the appropriate fields. Field P1.8 "Zip Code or Other" is provided to enter the postal code equivalent for addresses in the U.S. or in other countries. The "Country" field (P1.10) must be completed only if the address is outside Canada or the U.S. This field may also be used to enter other relevant address information, not contained in the other address fields, that needs to be on an address label for successful delivery.

A4.0 Facility Public Contact

Enter the name, position title, e-mail address, telephone and facsimile numbers of the facility's public contact. The public contact does not have to be the same person who prepares the report or signs the Statement of Certification and does not necessarily need to be someone at the reporting facility. However, this person should be able to answer questions from the public about the report. A position title alone, such as "Environmental Coordinator", can be used to identify the public contact. The facility public contact will be identified in the NPRI database available to the public. **If these fields are left blank, the technical contact (in field A6.0) will be listed as the public contact in the NPRI database.**

A5.0 Facility Public Contact Address

Complete this field if the mailing address for the public contact is different from the facility's site address (A2.0). The province, territory or U.S. state names can be found in pick-lists while the cursor is in these fields. Field A3.9 "Zip Code/Other" is provided for addresses in the U.S. or in other countries. The "Country" field (A5.10) must be completed only if the address is outside Canada or the U.S.

A6.0 Facility Technical Contact

Enter the name, position title, e-mail address, telephone and facsimile numbers of a technical representative who can be contacted by Environment Canada for clarification of the report. This person should be familiar with the details of the report and be able to answer questions about the information provided. **The technical contact will be listed as the public contact in the NPRI database if a public contact is not named in section A4.0.** Unless a company coordinator is identified in section A8.0, the technical contact will receive all information, mailings and inquiries from Environment Canada. **A consultant can be the technical contact as long as a company coordinator is identified in section A8.0.**

A7.0 Facility Technical Contact Address

If the mailing address for the technical contact is different from the facility's site address (A2.0), complete this field as described in A5.0.

A21.0 Contractor Contact

If an independent contractor is submitting the NPRI report on behalf of a facility, enter the independent contractor information. This section will already be completed if you entered this information in C1.0 in the opening screens (see Step 3). C1.0 globally replaces A21.0 for all of a company's facilities in the NPRI report. However, if different contractors were used for some facilities, you can modify the independent contractor contact information for individual facilities through this section.

A22.0 Contractor Contact Address

Complete the fields in A22.0 as described in A5.0. If you filled out C2.0 fields in the opening screens, these fields will already be completed. If the contractor is not the same for all facilities owned by a company, this screen will allow you to modify the contractor address for an individual facility.

A8.0 Company Coordinator

In addition to a facility technical contact, some companies may coordinate reports for several facilities through a central contact. If you answer "Yes" to the question "Would you like to have information sent to a central contact?", provide the name, position title, e-mail address, telephone and facsimile numbers for the company coordinator (fields A8.1 to A8.8). **Correspondence from Environment Canada will be addressed to the company coordinator. If there is no coordinator, correspondence will be sent to the technical contact. This section will already be completed if you entered this information in section C3.0 in the opening screens (see Step 3).**

A9.0 Company Coordinator Address

If the mailing address for the company coordinator is different from the facility's site address (A2.0), complete this section as described in A5.0. This section will already be completed if you entered this information in section C4.0 in the opening screens (see Step 3).

A10.0 Primary Industrial Classification Codes

Industrial classifications are a means of identifying different types of businesses and industries. The NPRI has adopted the North American Industry Classification System (NAICS Canada) as the standard for identifying industrial sectors to enable better comparisons of NPRI data with similar inventories in the U.S. and Mexico. This year, the NPRI will also continue to collect Canadian and American Standard Industrial Classification (SIC) data to retain continuity with historical data.

NOTE: Many facilities report industrial classification codes that are inconsistent with their industrial activities. Facilities must verify that the Canadian Standard Industrial Classification (SIC), U.S. SIC and North American Industry Classification System (NAICS) codes that they report best describe their primary business activity. If you have any questions about selecting industrial classification codes, contact your regional NPRI office.

North American Industry Classification System (NAICS)

The NAICS was developed by Statistics Canada, the U.S. Office of Management and Budget and Mexico's Instituto Nacional de Estadistica Geografia e Informatica, to enable the respective national agencies to collect comparable statistical data (Statistics Canada, 1998). It has replaced the 1980 SIC as the standard for classifying industries by Statistics Canada. Statistics Canada provides complete details of NAICS Canada on its Web site at <www.statcan.ca/english/Subjects/Standard/index.htm>.

You can order a copy of the NAICS Canada Manual (printed version, Catalogue No. 12-501-XPE; CD-ROM, Catalogue No. 12-501-XCB) on-line, toll free at 1-800-700-1033 (voice) or 1-800-889-9734 (fax), or through Statistics Canada Regional Reference Centres.

The NAICS Canada consists of 20 sectors, 99 subsectors, 321 industry groups, 734 industries and 921 national industries. Industries within these sectors are grouped according to their production processes rather than the goods or services produced. The numbering system that has been adopted is a six-digit code, of which the first five digits are used by the three countries to produce comparable data. The first two digits designate the sector, the third digit designates the subsector, the fourth digit designates the industry group and the fifth digit designates industries. For example, the first two digits "22" designate the utilities sector comprised of industries engaged in operating gas, electrical and water utilities. The four-digit NAICS code "2211" refers to the electric power generation, transmission and distribution industry group. Within this group, "22111" refers specifically to electric power generation while "22112" is electric power transmission, control and distribution. The sixth digit is used to designate national industries. At this level, the respective national agencies are free to define classifications relevant to their own economies. In this example, hydro-electric, fossil-fuel-electric and nuclear-electric power generation have the NAICS Canada codes "221111", "221112", and "221113", respectively.

Sector and subsector NAICS classifications and their corresponding two-, three- and four-digit codes are listed in Appendix 8. The electronic reporting form provides a pick-list of the NAICS codes. If you are unsure about the correct NAICS code for your facility, contact your regional NPRI office.

Standard Industrial Classification (SIC) Codes

SIC codes are numerical identifiers for different types of businesses and industries (Statistics Canada, 1989). The first two digits of a four-digit SIC code define a major business sector, while the last two denote a facility's specialty within that sector. For example, the first two digits (37) of the Canadian SIC code "3751" represent the chemical industry in general, and the last two digits (51) represent the paints and varnishes industry. Code "3741" represents the same major sector but denotes the pharmaceutical industry. Two-digit Canadian and American SIC codes are listed in Appendices 9 and 10, respectively. The electronic reporting form provides a pick-list of two-digit Canadian SIC codes. The software also provides concordance tables of four-digit Canadian SIC codes and their corresponding U.S. SIC codes. If you are unsure about the correct SIC code for your facility, contact your regional NPRI office.

A10.1 Two-digit Canadian SIC Code

Enter the two-digit Canadian SIC code that best represents your facility as found in Appendix 9 or access the pick-list and choose the appropriate number. Your facility may be engaged in several different activities that are described by more than one SIC code. If so, use the SIC code that describes the primary business activity.

A10.2 Four-digit Canadian SIC Code

Based on the two-digit code entered in field A10.1, the software will provide a pick-list of four-digit codes associated with your industrial sector. Select the most appropriate Canadian SIC code for your facility according to the description provided.

A10.3 Four-digit U.S. SIC Code

Based on the Canadian SIC code entered in field A10.2, the software will provide a pick-list of corresponding four-digit U.S. codes. As some Canadian classifications are broader than the U.S. codes, there may be more than one U.S. code for each Canadian code. **A common error is to select the first choice offered by the software.** Be certain to select the appropriate U.S. SIC code for your facility.

A10.4 Two-digit NAICS Code

Choose the two-digit code or range of codes which best describe the industrial sector in which your facility operates. A pick-list of two-digit codes is available or you may refer to the NAICS codes in Appendix 8. Note that some sectors, such as manufacturing (31-33), span several two-digit codes. Use the pick-list to select the correct range of two-digit NAICS codes.

A10.5 Four-digit NAICS Code

Based on the two-digit NAICS code entered in field A10.4, the software will provide a pick-list of four-digit NAICS codes for the corresponding subsectors. A list of four-digit NAICS codes is also given in Appendix 8.

A10.6 Six-digit NAICS Canada Code

Based on the four-digit NAICS code entered in field A10.5, the software will provide a pick-list of six-digit NAICS Canada codes for the corresponding national industries.

A11.0 Number of Full-time Employees or Equivalent

A11.1 Number of Employees

Enter the number of full-time (or equivalent) employees at your facility. This threshold depends specifically on the number of hours worked by all employees at the facility during the calendar year and not on the number of persons working. To determine the number of full-time employee equivalents, total the hours worked by:

- persons employed at the facility, including students, part-time and term employees
- owner(s) who performed work on site at the facility, and
- persons who performed work on site at the facility on a routine basis related to the normal operation of the facility, for the period of time the person performed that work, such as contractors,

and divide the total by 2 000 hours. The total number of hours worked includes paid vacation and sick leave.

A11.2 Activities to Which the 20 000-hour Employee Threshold does not Apply

The 20 000-hour employee threshold does not apply to facilities used for certain types of incineration, wood preservation, terminal operations and wastewater collection facilities discharging 10 000 m^3/day or more of water to surface waters. Refer to Step 1 for more information on these activities.

If your facility was used exclusively or mainly for one of the incineration activities (A11.2.a – A11.2.d), you must submit an NPRI report for dioxins/furans and HCB. You may also have to submit a report for any NPRI Part 1A, 1B, 2 or 4 substances, provided their respective substance criteria are met. If any of the incineration activities (A11.2.a – A11.2.d) are chosen, the corresponding fields in A12.1 will be checked.

Wood preservation alone (A11.2.e) does not trigger NPRI reporting. You may also have to submit a report for any NPRI Part 1A, 1B or 4 substances provided their respective substance criteria are met. If your facility used pentachlorophenol, you must select field A12.1.q when it is presented in a subsequent screen and submit reports for dioxins/furans and HCB (see Step 2, Part 3 Substances). If your facility used creosote for wood preservation, select "Yes" in field A13.1 when it is presented in a subsequent screen. You must submit NPRI reports for PAHs (see Step 2, Part 2 Substances).

Was the facility used mainly or exclusively for:

A11.2.a **Non-hazardous solid waste incineration** (≥ **26 tonnes/year**) – Non-hazardous solid waste means any waste, regardless of origin, which might normally be disposed of in a non-secure manner, such as at a sanitary landfill site, if not incinerated. It includes clean wood waste, i.e., waste from woodworking or forest product operations, including bark, where the wood waste has not been treated with preservative chemicals (e.g., pentachlorophenol) or decorative coatings. Non-hazardous solid waste incineration includes incineration of residential and other municipal wastes in conical burners, and clean wood waste in beehive burners.

A11.2.b **Biomedical or hospital waste incineration** (≥ **26 tonnes/year**) – Biomedical waste is defined fully in Appendix 4. Biomedical or hospital waste refers to waste that is generated by:

- human or animal health-care facilities
- medical or veterinary research and testing establishments
- health-care teaching establishments
- clinical testing or research laboratories, and
- facilities involved in the production or testing of vaccines.

Biomedical or hospital waste includes human anatomical waste and animal waste. It also includes microbiology laboratory waste, human blood and body fluid waste, and waste sharps that have not been disinfected or decontaminated. It does not include waste from animal husbandry, or waste that is controlled in accordance with the *Health of Animals Act* (Canada).

Wastes that are household in origin, or that are generated in the food production, general building maintenance and office administration activities of those facilities to which this definition applies, are not considered to be biomedical or hospital waste but rather to be non-hazardous solid waste.

A11.2.c **Hazardous waste incineration** – Hazardous waste is defined fully in Appendix 5. Hazardous waste includes those wastes that are potentially hazardous to human health and/or the environment because of their nature and quantity, and that require special handling techniques. Hazardous waste incinerators must be licensed or authorized by the responsible jurisdiction. Hazardous waste incinerated in a mobile incinerator temporarily located at your facility must be included as part of this activity.

A11.2.d **Sewage sludge incineration** – Sludge means a semi-liquid mass removed from a liquid flow of wastes. Sewage sludge means sludge from a facility treating wastewater from a sanitary sewer system. The drying of sludge to reduce water content is part of the incineration stage.

A11.2.e **Wood preservation** – Select this if your facility was used mainly or exclusively for wood preservation by means of heat or pressure treatment, or both, or for the manufacture, blending or reformulation of wood preservatives. If your facility used pentachlorophenol, also select field A12.1.q. If your facility used creosote, also select field A13.1.

A11.2.f **Terminal operations** – Select this option if your facility is a terminal operation. For the purposes of reporting, terminal operations refer to either: i) the use of storage tanks and associated equipment at a site used to store or transfer crude oil, artificial crude or intermediates of fuel products into or out of a pipeline; or ii) operating activities of a primary distribution installation normally equipped with floating roof tanks that receives gasoline by pipeline, railcar, marine vessel or directly from a refinery. Terminal operations do not include bulk plants or service stations.

A11.2.g **Discharge of treated or untreated wastewater (>= 10 000 m^3/day)** – Select this option if your facility had an annual average discharge of 10 000 m^3 or more per day of treated or untreated wastewater to surface waters.

A11.2.h **None of the above** – If your facility was not used for one of the activities described above, the 20 000-hour employee threshold applies when reporting to the NPRI for Part 1A, 1B, 2 and 3 substances.

A12.0 Activities Relevant to the Reporting of Dioxins/Furans and Hexachlorobenzene

The criteria for reporting NPRI Part 3 substances is based on specific activities in which a facility engaged, not on quantities released or transferred. A facility may have engaged in one of these activities, even if it was not the sole activity at the facility. A facility engaged in one or more of the activities listed below (A12.1.a - A12.1.q) must submit reports for dioxins/furans and HCB if it also met the 20 000-hour employee threshold (see Step 1, Reporting Criteria for Part 3 Substances). If, however, the facility was used mainly or exclusively for any of the incineration activities (A12.1.a - A12.1.d), or for wood preservation using pentachlorophenol (A12.1.q), the facility must report releases and transfers of dioxins/furans and HCB regardless of the number of hours worked by employees. Information to be reported for dioxins/furans and HCB differs from that required in other NPRI substance reports. Refer to Step 2, Part 3 Substances, for further details.

A12.1.a **Non-hazardous solid waste incineration (≥ 26 tonnes/year)** – See A11.2.a.

A12.1.b **Biomedical or hospital waste incineration (≥ 26 tonnes/year)** – See A11.2.b.

A12.1.c **Hazardous waste incineration** – See A11.2.c.

A12.1.d **Sewage sludge incineration** – See A11.2.d.

A12.1.e **Base metals smelting (including copper, lead, nickel and zinc)** – refers to copper, lead, nickel and zinc. This activity does not include smelting of aluminum or any other metals. It also does not include the smelting of secondary lead or secondary aluminum which are identified in field A12.1.f and A12.1.g, respectively. Smelting is defined in Step 1 "Reporting Criteria for Part 3 Substances".

A12.1.f **Smelting of secondary lead** – refers to lead-bearing scrap or lead-bearing materials, other than lead-bearing concentrates derived from a mining operation. Facilities engaged in smelting of lead-bearing concentrates derived from a mining operation are considered to be base metals smelters (see A12.1.e).

A12.1.g **Smelting of secondary aluminum** – refers to aluminum-bearing scrap or aluminum-bearing materials. Secondary aluminum smelting involves two processes – pre-cleaning and smelting – both of which may produce dioxins/furans emissions.

A12.1.h **Manufacturing of iron using a sintering process** – Sintering is the welding together and growth of contact area between two or more initially distinct particles at temperatures below the melting point, but above one-half of the melting point (in Kelvin). In sintering operations, dioxins/furans may be formed as unwanted by-products during high-temperature decomposition and combustion of raw materials containing chlorine and organic compounds.

A12.1.i **Operation of electric arc furnaces in steel manufacturing** – In an electric arc furnace, material is heated by the heat energy released from an electric arc. The electric arc is a component of an electric circuit, like a resistor, but with its own peculiar characteristics. Dioxins/furans may be formed as unwanted by-products during high-temperature decomposition and combustion of raw materials containing chlorine and organic compounds.

A12.1.j **Operation of electric arc furnaces in steel foundries** – In an electric arc furnace, material is heated by the heat energy released from an electric arc during which dioxins/furans and HCB may be formed.

A12.1.k **Production of magnesium** – Production of magnesium from magnesium chloride by electrolysis may result in the generation of dioxins/furans and HCB.

A12.1.l **Manufacturing of portland cement** – Portland cement is a fine greyish powder consisting of four basic materials – lime, silica, alumina and iron compounds. Cement production involves heating (pyroprocessing) the raw materials to a high temperature in a rotating kiln to induce chemical reactions that produce a fused material called clinker. The cement clinker is further ground into a fine powder, then mixed with gypsum to form portland cement.

A12.1.m **Production of chlorinated organic solvents or chlorinated monomers** – This activity is limited to the intentional manufacturing of chlorinated organic solvents or chlorinated monomers, and does not include coincidental production.

A12.1.n **Combustion of fossil fuel in a boiler unit to produce electricity (≥ 25 megawatts)** – This activity is limited to the combustion of a fossil fuel in a boiler unit, for the purpose of producing steam for the production of electricity, with a nameplate capacity of 25 megawatts or greater of electricity. Fossil fuel means a fuel that is in a solid or liquid state at standard temperature and pressure (such as coal, petroleum or any liquid or solid fuel derived from such). It does not include combustion of natural gas or other fuels that are gaseous in form at ambient pressure and temperature. It also does not include diesel generators, which are not boiler units.

A12.1.o **Combustion of salt-laden logs in pulp & paper sector** – Pulp and paper boilers burning salt-laden wood are unique to British Columbia. Dioxins/furans are emitted from the burning of salt-contaminated hog fuel. Logs transported and stored in salt water take up chlorine into the bark. The bark is stripped from logs and ground up with other waste wood to produce hog fuel. The material is then used as boiler fuel to produce heat and electrical energy for pulp and paper processes. The *Canada-wide Standards for Dioxins and Furans* state that every boiler covered by the Standards will be tested twice each year to determine the level of dioxins/furans air emissions for the years prior to 2003, and annually for the year 2003 and beyond.

A12.1.p **Combustion of fuel in kraft liquor boilers in pulp & paper sector** – A kraft liquor boiler burns black liquor, composed mostly of lignin, the residue from the digester in a kraft (sulphate) pulping process. The boiler recovers chemical products from the combusted black liquor, which are later recycled, and also produces steam which is used in mill process operations.

A12.1.q **Wood preservation using pentachlorophenol** – Pentachlorophenol (PCP), by its chemical structure, is a close surrogate to HCB. PCP is derived from HCB by substituting one of HCB's six chloro-substituents with a hydroxyl group. Given its chemical similarity to HCB and that its manufacturing ingredients contain the precursors for dioxin/furan production (i.e., chlorinated aromatics), the manufacture of PCP often results in the incidental manufacture of both HCB and dioxins/furans. Hence, dioxins/furans and HCB are present in PCP formulations used for wood preservation and may be released or transferred when used for wood preservation.

A12.1.r **None of the above** – If your facility was not engaged in any of the activities described above, then your facility may not have to submit reports for dioxins/furans and HCB.

A13.0 Activity Relevant to the Reporting of Polycyclic Aromatic Hydrocarbons (PAHs)

A13.1 Was the Facility Used for Wood Preservation Using Creosote?

Wood preservation means the use of a preservative for the preservation of wood by means of heat or pressure treatment, or both, and includes the manufacture, blending or reformulation of wood preservatives for that purpose. There is no 50-kg reporting threshold for PAHs released or transferred from a wood-preservation process using creosote, since the PAHs are contained in the creosote and not incidentally manufactured. A facility used for wood preservation must report any of the 17 individual PAHs incidentally manufactured and released on site or transferred off site from a wood-preservation process using creosote, **regardless of the number of hours worked by employees.** If selected, field A11.2.e – Wood Preservation, will be automatically selected.

A25.0 Criteria Air Contaminants (CACs)

A25.1 Are you required to report for one or more criteria air contaminants?

Select either "Yes" or "No". If you select "Yes", you are required to enter the facility's operating schedule (fields T1.1 through T1.5). Otherwise, leave the answer as "No". To enter the operating schedule, select the "View Operating Schedule" button on the right of the field.

T1.0 Facility Operating Schedule (Temporal Variation)
For a detailed explanation of temporal variation, refer to Appendix 7 of the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory.*

T1.1 Days of Operation
You must select the appropriate days of the week on which your facility operates.

T1.2 Hours of Operation
You are required to select the appropriate hours of operation for your facility. Three common hours-per-day schedules are given; "other" is used to capture non-standard schedules. If you choose "other", you must complete sections T1.2.a(ii) and T1.2.b.

T1.2.a Hours of operation

T1.2.a(i) Select the appropriate hours of operation. Your options are 24, 16 or 8 hours per day. If none of these options are applicable, select "other" and complete field T1.2.a(ii).

T1.2.a(ii) If "Other", then provide the average total daily hours of operation
On this portion of the screen you will need to complete the following statement:
"Average total daily hours of operation: ____ hours." (input is in hours, to 2 decimal places, e.g., 21.15).

T1.2.b Average daily start time of operation
This portion of the screen follows up your total daily hours of operation (response to T1.2.a) by asking you to provide Environment Canada with your average daily start time. The software will ask you to complete the following statement:
"Average daily start time of operation: ____." (use the 24-hour format of *hhmm*, e.g., 1130).

T1.3 Were there any periods of time longer than one week when operations at your facility were shut down?
The shutdown could be for scheduled or unscheduled maintenance or any other operations requiring a facility shutdown. Selecting either "Yes" or "No" is all that is required for reporting. Selecting "Yes" will present the screen for entering your shutdown periods and pressing the "View Shutdown Periods" button will present the shutdown screen for your viewing (field T1.4).

T1.4 Dates and times of shutdown periods (one week or longer)
To add the duration information about a shutdown select "Add" on the right of the screen. You are required to enter the start date (as *yyyy.mm.dd*), the start time (as *hhmm*), end date (as *yyyy.mm.dd*), and end time (as *hhmm*) of the operation's shutdown. Ensure that the start and finish time are in the 24-hour time format, where 0000 and 2400 indicate midnight.

T1.5 Comments (Shutdown periods) (optional)
If you wish to provide comments on why your facility was shut down for one week or longer, select "Yes". You will be presented with a screen to enter your comments.

A26.0 Pollution-Prevention (P2) Planning

A26.1 Did your facility prepare or implement any P2 plans?
Pollution-prevention (P2) planning is a process to examine current operations and develop a plan to eliminate or reduce pollution at the source. A P2 plan documents ways to prevent or minimize the creation of pollutants and waste, and identifies where investment in P2 would lead to cost savings. Such plans can target a specific pollutant, a production process or an entire facility. In this field, facilities must identify whether a P2 plan was prepared and/or implemented during the 2002 calendar year. Facilities are encouraged to provide additional information describing P2 plans that were prepared or implemented at the facility. These descriptions may be entered in the facility "Comments (Pollution Prevention)" field (A15.2).

A26.2 If so,

a) **Were any P2 plans required by notice under the CEPA 1999?**

Part 4 of the CEPA 1999 gives the Minister of the Environment the authority to require the preparation and implementation of P2 plans to manage substances that have been added to the List of Toxic Substances in the Act. Such requirements are made by publishing a notice in the *Canada Gazette*, Part I. If a P2 plan was prepared and/or implemented during the 2002 calendar year, facilities must identify whether the plan was developed to meet the requirements of a *Canada Gazette* notice requiring the preparation and implementation of P2 plans.

b) **Were any P2 plans prepared or implemented for another government or under another Act of Parliament?**

If a P2 plan was prepared and/or implemented during the 2002 calendar year, facilities must identify whether the plan was developed to comply with legal requirements other than a *Canada Gazette* notice requiring the preparation and implementation of P2 plans, such as for another government or another Act of Parliament. Examples of other legal requirements for which a P2 plan may have been prepared and/or implemented include municipal by-laws, provincial regulations and court orders. Facilities are encouraged to provide additional information describing P2 plans that were prepared or implemented at the facility. These descriptions may be entered in the facility "Comments (Pollution Prevention)" field (A15.2).

c) **Were any P2 plans prepared or implemented on a voluntary basis?**

If a facility prepared or implemented a P2 plan during the 2002 calendar year, facilities must identify whether the plan was developed on a voluntary basis. Facilities are encouraged to provide additional information describing P2 plans that were prepared or implemented at the facility. These descriptions may be entered in the facility "Comments (Pollution Prevention)" field (A15.2).

A14.0 Other Environmental Regulations or Permits (optional)

This optional field identifies other government organizations, agencies or programs to which you report environmental data. These identifiers may be municipal, provincial, territorial or regional operating permit numbers, certificates of approval or numbers used to identify your facility for a survey on releases or transfers to the environment.

If you wish to provide the environmental identification numbers that exist for your facility, select "Yes" for question A14.1, "Do you report under other environmental regulations or permits?" The electronic form will present a screen to allow the entry of this information. Select "Add" and enter the appropriate identifier or permit number in the column entitled "ID Number" and the government and program that provided you this number in the column entitled "Government Department, Agency or Program Name".

If you do not report under any other environmental regulations, select "No". If you choose not to complete this field, select "Decline to answer".

Example 1

In **Ontario**, include the *Ontario Hazardous Waste Generator Registration Number* (HWIN). The HWIN is a nine-digit alphanumeric number (e.g., ON1234500) assigned to each facility under Ontario Regulation 347 (*Ontario Environmental Protection Act*).

Example 2

Facilities located in **Alberta** handling hazardous waste have to register for and may have more than one provincial ID number(s), assigned by Alberta Environmental Protection. Facilities receiving, consigning or transporting hazardous wastes are assigned provincial ID numbers. The ID number is an eight-digit alphanumeric number (e.g., ABR09999).

Example 3

Facilities located in **British Columbia** have permits allowing them to release to the environment and may have more than one provincial or municipal permit(s) assigned by their local municipalities, such as the Greater Vancouver Regional District (GVRD) or the British Columbia Ministry of Water, Land and Air Protection (BCMWLAP). Facilities having discharges are assigned a permit number. The ID number is alphanumeric (e.g., for air permits, PA-12345 or GVA1234).

A15.0 Comments

Comment fields are limited to 750 characters. Be succinct when providing comments.

A15.1 Comments (Facility)

This field is for comments regarding the facility information provided in this section or on any issue pertaining to your NPRI report in general. For example:

- an explanation of why a substance is no longer reported to the NPRI
- details of a plant closure that resulted in reduced releases and transfers of all substances reported by the facility, or
- details of a one-time site remediation program which dramatically increased off-site transfers of several substances.

These comments will appear in the NPRI database available to the public and are your opportunity to provide context for the information reported to the NPRI. Comments specific to a substance being reported should be provided in the "Substances" report.

A15.2 Comments (Pollution Prevention)

In addition to the pollution-prevention (P2) activities reported for a specific substance in B30.0, information on general facility-wide P2 activities such as water- and energy-conservation initiatives can be provided in this comments field. P2 activities that were implemented in a year other than 2002, may also be entered in this field, along with the year in which the activity was implemented. Facilities are encouraged to provide additional information describing their P2 initiatives (including P2 plans) and results achieved (e.g., environmental results, economic benefits, etc.). These comments will appear in the NPRI database available to the public and are an opportunity to provide context for the information reported to the NPRI.

Keep in mind that pollution prevention **does not** include on-site treatment (pollution control), off-site recycling, off-site disposal, waste treatment or dilution, or transferring hazardous and/or toxic constituents from one environmental medium to another. Refer to section B30.0, Pollution-Prevention Activities, for more information on pollution prevention, and related activities.

A16.0 Company Official Certifying this Submission

A "Statement of Certification" (SoC) can be printed at the end of the Export process (see Step 6) by selecting "Print Statement of Certification". Alternatively, you can also print your SoC through the "Print Reports Menu". **If you are unable to print an SoC, contact your regional NPRI office immediately.** A brief summary of the NPRI report is printed as part of the SoC. It lists the reporting facilities, their substances and the total quantities of substances released on site and/or transferred off site for disposal or recycling. (This statement is automatically adjusted to include the data required by the selected program, in this case Environment Canada, and may not reflect all the data you entered into the software.)

The NPRI report submitted to Environment Canada must include an SoC signed by an official of the company. Normally, the company official is the person identified in section A16.0. This person must have delegated powers to accept legal responsibility for the information provided. Some facilities may choose a CEO, the environmental coordinator or the plant manager. The person who signs this statement acknowledges that:

- he/she has reviewed the documents
- he/she has exercised due diligence to ensure that the information provided is true and complete, and
- the amounts and values provided in the report are accurate, based on reasonable estimates using available data.

The name of the company official will not appear in the public database.

A17.0 Company Official Address

If the mailing address for the company official contact is different from the facility's site address (A2.0), complete this field as described in A5.0.

This is the end of the first section of the reporting form. You have the options of saving the facility information, cancelling the changes or returning to the facility report.

Return to the "View / Enter / Edit Data" menu and proceed to Step 5.

To add or modify a substance report, after entering at least one facility, select "Substances" from the "View / Enter / Edit Data" menu. A substance report consists of the following sections:

- Section B1 Substance Information
- Section B10 On-site Releases to the Environment
- Section B20 Off-site Transfers for Disposal or Recycling
- Section B30 Pollution-Prevention Activities
- Section B40 Production Ratio and Activity Index

Step 5 – Enter or update the NPRI substance information

There are four different sets of substances and reporting criteria. Consult Step 1 to determine which substances you are required to report and Step 2 for how to report your data. **If you met the reporting criteria for a substance, you must submit a report for that substance even if there are no releases or transfers.**

If your facility is located in Alberta and you are required to report to the NPRI and under an Alberta Environment (AENV) Approval, the software will display both the NPRI and AENV fields. A separate guidance document for reporting under Alberta Approvals using the NPRI software is available.

If your facility is located in Ontario and you are required to report to the NPRI and the ON MOE, the software will display both the NPRI and ON MOE fields. Refer to the *Guide for Reporting under O.Reg.127/01 Using the NPRI Software – 2002* for a description of the ON MOE fields. Alternatively, "Help" can also be obtained by pressing the F1 key.

Units of Measure

The units of measure depend upon the substance being reported. Generally, release, disposal and recycling quantities are reported in tonnes. However, for substances with lower reporting thresholds, these quantities are reported in kilograms or grams. Field B1.3 displays the units of measure. The software determines what units will be used once a substance has been selected and displays the appropriate units on each screen where quantity data are requested.

PART	SUBSTANCE	UNITS
Part 1A	241 Substances	tonnes
Part 1B	Mercury[1], cadmium[1], arsenic[1], hexavalent chromium compounds, lead[2], tetraethyl lead	kilograms
Part 2	Polycyclic aromatic hydrocarbons (PAHs)	kilograms
Part 3	Hexachlorobenzene (HCB)	grams
Part 3	Dioxins/furans	grams (TEQ)[3]
Part 4	Criteria air contaminants (CACs)	tonnes

and its compounds.
and its compounds, except tetraethyl lead (CAS No. 78-00-2), does not include lead contained in stainless steel, brass or bronze alloys.
ee Step 2, Part 3 Substances for explanation of these units.

NOTE: Double check your report to ensure you have reported your releases and transfers in the correct units as noted above.

"Basis of Estimate" Codes

You must report a "Basis of Estimate" code for each release or transfer quantity you report. This code provides information about how you determined the quantity of an NPRI substance that was released on site or transferred off site for disposal or recycling. Codes for the four methods used to estimate releases and transfers along with two other codes used by the software are listed below. A detailed description of these estimation methods is provided in Step 2, Methods of Estimation, of this Guide. Reference documents that may assist with your estimates are listed in the References and Bibliography section and examples of each estimation method are given in Appendix 6 of this Guide.

CODE	DESCRIPTION
M	**Monitoring or direct measurement** – This is the most accurate estimation method. An example is monthly monitoring of a substance in a waste stream and the volume flow rate of that stream. If you are reporting for dioxins/furans or HCB, the "Detail" codes field will be enabled (see below).
C	**Mass balance** – A mass balance is an accounting of the quantity of a substance going in and out of an entire facility, process or piece of equipment. Releases can be calculated as the difference between input and output.
E	**Emission factors** – An emission factor is based on average measured emissions from several similar processes. Emission factors usually express releases as a ratio of quantity released to process or equipment throughput.
O	**Engineering estimates** – This estimation method is based on physical/chemical properties (e.g., vapour pressure) of the substance and mathematical relationships (e.g., ideal gas law).
NA	**Not applicable** – This indicates that there were no releases or transfers from your facility to this medium.
NI	**No information available** – This code is for dioxins/furans and HCB. Select this code only if your facility met the reporting criteria for dioxins/furans or HCB, but you have no information available on which to base an estimate of the quantity released or transferred.

The reporting software has a pick-list for choosing the "Basis of Estimate" codes. Select the letter code identifying the method that applies to the largest portion of the estimated releases or transfers.

Dioxins/Furans and HCB

The reporting requirements for dioxins/furans and HCB differ greatly from those for other substances in the NPRI. Refer to Step 1, Reporting Criteria for Part 3 Substances, for details. An NPRI substance report for dioxins/furans or HCB will indicate:

- the quantity released on site or transferred off site as the result of **incidental manufacture** from prescribed activities
- the quantity released on site or transferred off site resulting from **wood preservation using pentachlorophenol**
- **for direct measurements only**, that the measured concentrations were above, equal to or below the **Level of Quantification (LoQ)**
- that there were no releases to a specific medium or no transfers off site, or
- that **no information** was available on which to base an estimate.

Level of Quantification (LoQ)

The level of quantification is defined in Section 65.1 of the CEPA 1999, as "the lowest concentration that can be accurately measured using sensitive but routine sampling and analytical methods". Environment Canada determines LoQ values by carrying out statistical analyses of several sets of measurements from a variety of emission sources. The LoQ is calculated as 10 times the standard deviation of replicated measurements (ASTM, 2002). For some media and some analytical methods, the detection limit may be lower than the LoQ recommended by Environment Canada. Table 13 in Step 2 lists the LoQ for dioxins/furans and HCB for three types of material or waste streams that may be released on site or transferred off site – gaseous, liquid and solid. The LoQ values listed include both final, draft and estimated values published by Environment Canada. In the reporting software, the "Detail" code is used to indicate if your measured concentrations were above, equal to or below the LoQ for each type of material that you released on site or transferred off site.

"Detail" Codes

"Detail" codes are required and only available for dioxins/furans and HCB substance reports. A "Detail" code is required only if the release, disposal or recycling data were obtained through direct measurement or monitoring (code "M" in the "Basis of Estimate" field). The "Detail" code is used to indicate if your measured concentrations are above, equal to or below the LoQ. The "Detail" code field is adjacent to the "Basis of Estimate" field. Three "Detail" codes are available:

CODE	DESCRIPTION
AL	**At or Above LoQ** – The measured concentration was equal to or greater than the LoQ – If chosen, you must enter the quantity of the substance that was released on site or transferred off site for disposal or recycling.
BL	**Below LoQ (no quantity entered)** – The measured concentration was below the LoQ – This indicates that the substance may have been present but you did not quantify the amount that was released on site or transferred off site for disposal or recycling.
BQ	**Below LoQ (quantity entered)** – The measured concentration was below the LoQ – If chosen, this indicates that you have opted to report the quantity of the substance that was released on site or transferred off site for disposal or recycling based on a measured concentration that was less than Environment Canada's LoQ.

How to Report Releases and Transfers of Dioxins/Furans and HCB

The use of "Basis of Estimate" and "Detail" codes is summarized in Step 2.

B1.0 Substance Identity

Select the name of the NPRI substance and its CAS number. The reporting software provides pick-lists for the NPRI substances and their CAS numbers. Appendix 1 lists the NPRI substances alphabetically and Appendix 2 lists the NPRI substances by CAS number.

Report only NPRI substances. For example, if you use silver nitrate, do not report silver nitrate with its corresponding CAS number because the NPRI does not list silver nitrate as an individual compound. Report this substance as "silver (and its compounds)". The reporting software will only accept the names and the CAS numbers of substances on the NPRI list.

The NPRI reporting form can be used to complete reports under ARET 2, Environmental Performance Agreements, Regulation 127/01 of the Ontario Ministry of the Environment, Alberta Environment and for the National Emissions Reduction Masterplan (NERM) of the Canadian Chemical Producers' Association. If you have selected the appropriate inventory(s) in the "inventory program selection" screen of the NPRI reporting software (Step 3), the pick-lists in fields B1.1 and B1.2 will display the substances for the inventory(s) selected. (This may result in more or fewer substances being presented in the pick-lists associated with these fields than those listed in the 2002 NPRI; this is normal.)

B1.1 CAS Registry Number

Select the CAS number of the NPRI substance for which you are reporting. A pick-list of NPRI substances, listed numerically by CAS number, is available. Once the CAS number is identified and selected from the pick-list in field B1.1, the program will automatically place the substance name in field B1.2. **Some NPRI substances, such as "ammonia (total)" or "(element) and its compounds", do not have unique CAS numbers and are identified by "NA" on the pick-list.**

B1.2 Substance Name

If you do not know the CAS number of the substance for which you are reporting, you can choose from a pick-list in field B1.2 of substance names. Once the substance name has been selected, the CAS number will automatically be inserted into field B1.1. The program will enter "NA" in the CAS number field for groups of NPRI substances which do not have unique CAS numbers, such as "zinc (and its compounds)".

B1.3 Units of Measurement

This field displays the units of measure. The units of measure will also be displayed wherever quantity data are reported (e.g., when entering on-site releases or anticipated disposals). The software determines what units will be used once a substance has been selected.

B1.4 This Substance is on the Following Program List(s):

Indicators will show if the substance is on the NPRI, ON MOE, AENV, ARET 2, or NERM list(s).

B1.5 Inventory Program Selection Substances

a) **Report substance to all selected Inventory Program(s) listed below:**

If you wish to report this substance to all of the Inventory Program(s) listed here, select option a). Otherwise, proceed to option b).

b) **I am only required to submit a report for this substance to the following Inventory Program(s):**

This option permits you to deselect the Inventory Program(s) that are not applicable to a substance report. Ensure check marks remain for the programs that require reporting of the substance.

Note: Deselection of inventory programs can only be done on a substance-by-substance basis. Do not attempt to remove an inventory program globally through the "Selection of Inventory Program" screen.

B2.0 Nature of Activities

Indicate whether the NPRI substance was manufactured, processed or otherwise used, and the nature of such activities at the facility during the calendar year. For each substance, you may identify more than one activity.

B2.1 Manufacture the Substance

The term "manufacture" means to *produce, prepare or compound* an NPRI substance. This also includes the incidental production of an NPRI substance as a by-product as the result of the manufacture, processing, other use or treatment of other substances, products or materials. For example, certain NPRI substances may be manufactured as a result of wastewater treatment or other treatment processes.

Example of Manufacturing Activity

Your facility purchased chlorine and reacted it with sodium chlorite to form chlorine dioxide. Therefore, your company *processed* chlorine and *manufactured* chlorine dioxide. Both are NPRI substances. You are required to report both substances if you met the reporting criteria. Refer to Step 1, Calculating the 10-tonne Reporting Threshold.

Example of Incidental Manufacturing of By-products

Your facility manufactured aluminum. During the smelting process, hydrogen fluoride (HF) was released. The concentration of HF is 2 ppm but the quantity exceeded 10 tonnes per year. You are required to report your releases of HF because it was *produced as a by-product* and not subject to the 1% concentration criterion. You are not required to report solid aluminum because it is not an NPRI substance. You may have to report "aluminum (fume or dust)", as well as other NPRI substances, if all other reporting criteria are met. Refer to Step 1, Calculating the 10-tonne Reporting Threshold.

If you manufactured the substance being reported, select at least one of the following:

B2.1.a **For on-site use/processing** – The substance was manufactured and then further processed or used at the same facility.

B2.1.b **For sale/distribution** – The substance was manufactured specifically for sale or distribution outside the facility. For example, a mine mill processed metal ore on site to manufacture ore concentrates, and then sold the metal concentrate(s) outside the facility.

B2.1.c **As a by-product** – The substance was produced incidentally and released to the environment or transferred off site for disposal. See Step 1 for a complete discussion of NPRI by-products.

B2.1.d **As an impurity** – The substance was produced incidentally and remained in the product destined to be distributed in commerce.

B2.2 Process the Substance

The term "process" means the *preparation* of a listed substance, after its manufacture, for distribution in commerce, or the *use* of a listed substance as part of a chemical or physical process. Processing includes the preparation of a substance **with or without change** in physical or chemical form. The term also applies to the processing of materials, mixtures or formulations that contain a listed substance as one component. During processing, the substance is generally not separated from the product.

If your facility processed the substance, select at least one of the following:

B2.2.a **As a reactant** – An NPRI substance used in chemical reactions for the manufacture or processing of another substance or product. This includes, but is not limited to, feedstock, raw materials, intermediates, catalysts and nutrients added to wastewater treatment systems.

B2.2.b **As a formulation component** – A substance added to a product (or product mixture) before further distribution of the product. Examples of substances used in this capacity include, but are not limited to, additives, dyes, reaction diluents, initiators, solvents, inhibitors, emulsifiers, surfactants, lubricants, flame retardants and rheological modifiers.

B2.2.c **As an article component** – A substance that became an integral component of an article distributed for industrial, trade or consumer use. An example is ethylene glycol added to vehicle radiators during assembly.

B2.2.d **Repackaging only** – Processing or preparation of a substance (or product mixture) for distribution in commerce. This also includes transferring NPRI substances to or from bulk containers.

B2.2.e **As a by-product** – The NPRI substance was incidentally processed and was released to the environment or was transferred off site for disposal. See Step 1 for a complete discussion of NPRI by-products.

B2.3 Otherwise Use the Substance

"Otherwise use" encompasses any use or disposal of an NPRI substance that is relevant to the purposes of the facility that does not fall under the definitions of "manufacture" or "process". As an example, your facility cleaned equipment with a listed solvent; it *otherwise used* the substance (ancillary or other use). Note that such an activity is not considered "routine janitorial" or "facility grounds" maintenance.

If your facility otherwise used the substance, select at least one of the following:

B2.3.a **As a physical or chemical processing aid** – A substance that was added to a reaction mixture to aid in the manufacture or synthesis of another substance but was not intended to remain in or become part of the product or product mixture. Examples of such substances include, but are not limited to, process solvents, catalysts, inhibitors, initiators, reaction terminators and buffers.

B2.3.b **As a manufacturing aid** – A substance that aided the manufacturing process but did not become part of the resulting product and was not added to the reaction mixture during the manufacture or synthesis of another substance. Examples include process lubricants, metal-working fluids, coolants, refrigerants and hydraulic fluids.

B2.3.c **Ancillary or other use** – A substance in this category that was used at a facility for purposes other than as a chemical processing aid or manufacturing aid. This includes, but is not limited to, equipment cleaners, degreasers, fuels, flocculants and substances used for treating wastes.

B2.3.d **As a by-product** – The NPRI substance was incidentally present in a material that was otherwise used at the facility and released to the environment or transferred off site for disposal. See Step 1 for a complete discussion of NPRI by-products.

B9.0 ARET 2 - Collection of Use Information

If you have elected to report to ARET 2, you must answer "Yes" to either B9.1 or B9.2 or both; you cannot leave both fields as "No".

B9.1 Report releases of this substance to the ARET 2 program?

If your facility has committed to reporting on-site release reductions of this substance through an ARET 2 action plan, ensure that this box is checked "Yes". If you select "Yes", you will be prompted to enter base-year, milestone and target-year data (see sections M1.0 to M1.2 for a description of the release milestone screen).

M1.0 ARET 2 - MILESTONE DATA for RELEASES

M1.1 Releases Milestone Data Table

Select "Add" to add a new milestone year and value to the table. Complete the "Year" column, and your facility's projected releases in the specified units to all media outlined in your facility's action plan. Select

"Save" to add the values to the table. To edit or delete a value already entered, highlight the row and select "Edit" or "Delete". The first year entered in the table should be your facility's base-year information. *The base year must be no earlier than 2000.* The last year entered in the table should be your facility's target-year information. *The target year must be no later than 2010.* The completed milestone table should also include interim milestones, where applicable.

M1.2 Comments (Milestone Data for Releases)

To elaborate on information entered in the "Releases Milestone Data Table", select "Yes" and enter your comments in the space provided (maximum of 750 characters).

B9.2 Report use of this substance to the ARET 2 program?

If your facility has committed to reporting usage reduction information for this substance through an ARET 2 action plan, ensure that this box is checked "Yes". If you select "Yes", you will be prompted to enter base-year, milestone and target-year data (see sections M2.0 to M2.2 for a description of the use milestone screen).

M2.0 MILESTONE DATA for USAGE

M2.1 Usage Milestone Data Table

Select "Add" to add new milestone year and milestone values to the table. Select "Save" to add values to the table. To edit or delete a value already entered, highlight the row and select "Edit" or "Delete". The first entry in the table should be your facility's base-year information. *The base year must be no earlier than 2000.* The last entry in the table should be your facility's target-year information. *The target year must be no later than 2010.* The completed milestone table should also include interim milestones, where applicable.

M2.2 Comments (Milestone Data for Usage)

To elaborate on information entered in the "Usage Milestone Data Table", select "Yes" and enter your comments in the space provided (maximum of 750 characters).

B9.2.1 Total quantity of substance used on site

If you answered "Yes" to question B9.2, enter the total quantity of the ARET 2 substance used on site in the specified units.

On-site Releases to the Environment

If the reporting criteria are met for an NPRI substance, then **all** releases of that substance must be reported **regardless of the concentration or amount.**

B10.1 Do You Release This Substance On Site?

To report on-site releases of an NPRI substance, select "Yes" in field B10.1. If you select "No", the program automatically brings you to field B14.0 "Reasons for Changes in Quantities Released from Previous Year" and skips the sections for detailed release reporting.

B11.1 Releases of Less Than One Tonne

If the total of all your releases of an **NPRI Part 1A substance** to all media was less than one tonne, you have the option of reporting releases by environmental medium (B12.1 to B12.4 for releases to air, water, land and underground injection) or reporting only the total release to all media (B12.5). To report total releases to all media of less than one tonne of a substance, select "Yes" in field B11.1. This field is enabled only for NPRI Part 1A substances. The program will proceed directly to field B12.5 "Total Releases". Otherwise, select "No" and enter specific releases to each environmental medium.

B12.0 On-site Releases of the Substance to the Environment

If your releases were greater than one tonne, you must account for total releases of the substance from your facility to each environmental medium (air, water, land and underground injection). **Report the "net" release of the substance, not the total release of a mixture containing the substance.**

Some NPRI substances are listed as "(element) and its compounds". For these substances, report only the total amount of the element in the compounds released rather than the total amount of the compounds that contain the element. Total releases (B12.5) from your facility do not include transfers of the substance to off-site locations for disposal or recycling.

For each release by medium, enter a "Basis of Estimate" code. Selecting "NA" (Not applicable) indicates that there were no releases from your facility to this medium. Enter the letter code identifying the estimation method that applies to the largest portion of the releases. A pick-list is available for choosing the "Basis of Estimate" codes.

"Detail" codes are required and available only for dioxins/furans and HCB substance reports. A "Detail" code is required only if the release, disposal or recycling data were obtained through direct measurement or monitoring (code "M" in the "Basis of Estimate" field). The "Detail" code is used to indicate if your measured concentrations were above, equal to or below the LoQ.

B12.1 Air Releases

Report all air emissions of the NPRI substance, the basis of the estimate and the detail code, if applicable. Both routine releases, such as fugitive releases to air, and accidental or non-routine releases, such as a relief valve opening as a result of a process upset, should be included in your estimate of the quantity released.

B12.1.a **Stack or point releases** – Total releases from stack or point sources including stacks, vents, ducts, pipes or other confined process streams. Releases to air from pollution-control equipment generally fall into this category.

CAC Reporting:

For each stack greater than or equal to 50 metres above grade, you must identify CAC releases from the stack that met or exceeded the stack thresholds in Table 14. The button in the "# of Stacks" column shows the number of stacks that met the stack criteria and had attributable CAC releases. It will display a "?" if no stacks have been identified. Select the button to open a screen that allows you to attribute all or a portion of the identified release of a CAC substance to a stack greater than or equal to 50 metres above grade. Selecting "Add a Stack from pick-list" will present a screen with a "Pick-list of Stacks" that relate to this facility. If stacks have not been entered for this facility, then select the "Add a NEW Stack to the pick-list" button to add stacks to the pick-list.

You may add the names of new stacks to the pick-list if it is incomplete as described above or from the "View / Enter / Edit Data" menu by selecting the "Stacks (>=50 metres)" option (see Step 3).

TABLE 14: CAC THRESHOLDS FOR IDENTIFYING AND REPORTING FOR STACKS >= 50 METRES

CAC Substance	Stack Threshold
Carbon monoxide	5 tonnes
NO_x (expressed as NO_2)	5 tonnes
Sulphur dioxide	5 tonnes
Total particulate matter	5 tonnes
Volatile organic compounds	5 tonnes
$PM_{2.5}$	0.15 tonnes
PM_{10}	0.25 tonnes

For each stack greater than or equal to 50 metres above grade that met one or more of the stack thresholds, report the quantity released of each substance, and the physical parameters of that stack. If the physical parameters for the stack were already entered when reporting for another CAC substance, you are not required to enter them again as this information is retained within the stack pick-list.

Important: A stack may have met the criteria for one CAC substance but not for another.

Physical parameters of stacks greater than or equal to 50 metres above grade:

For each stack which met one or more of the stack thresholds, the stack height and diameter must be reported, as well as the exit temperature and exit velocity, if known. See Step 3, View / Enter / Edit Data, for a description of the physical parameter fields.

B12.1.b Storage or handling releases – The quantity of releases to air from storage or handling of a listed substance should be entered in this field.

B12.1.c Fugitive releases – Fugitive releases are the total of all releases to air that are not released through confined process streams. These releases include:

- fugitive equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, etc.
- evaporative losses from surface impoundments and spills
- releases from building ventilation systems, and
- any other fugitive or non-point air emissions from land treatment, mine tailings, storage piles, etc.

Do not include emissions from road dust when reporting total particulate matter, PM_{10}, and $PM_{2.5}$.

B12.1.d Spills – Any accidental releases to air that do not qualify as point or non-point air releases should be entered in this field.

B12.1.e Other non-point releases – Any other non-point air releases not estimated in one of the above air-related release types should be entered in this field.

B12.2 Underground Injection

Report the quantity of the NPRI substance injected **on site**, the basis of the estimate and the detail code, if applicable.

B12.3 Releases to Surface Waters

Report all releases of the NPRI substance to surface waters, the basis of the estimate and the detail code, if applicable. Do not include water bodies that received the general plant waste stream if this waste stream did not contain an NPRI substance or if reportable acids in the waste stream had been neutralized to a pH of 6.0 or greater prior to release.

B12.3.a Direct discharges – Direct discharges do not include discharges to an MSTP or other off-site wastewater treatment facilities. These discharges are considered off-site transfers for disposal which are reported in field B22.1.f.

B12.3.b Spills – Spills into surface waters include any accidental releases which may have occurred at your facility.

B12.3.c Leaks – A leak to surface waters differs from a spill in terms of the time required for an event. Spills normally occur over a period of hours or days, whereas a leak is a chronic event which occurs over periods of days or months.

For each surface water discharge, you must identify the receiving water bodies. The button in the "# of Water Bodies" column shows the number of water bodies receiving the discharge. It displays a "?" if no water bodies have been identified. Select the button to open a screen that allows you to attribute all or a portion of the identified discharges of a substance to a water body. Here you must identify the surface water bodies that received the discharge, as well as the quantity discharged to each surface water body. The software provides a pick-list of standard water body names that is drawn from the NPRI database and the *Gazetteer of Canada*. The pick-list is sorted by province. If the water body to which you discharged is not on the pick-list, you can add the water body by selecting "Add a NEW Water Body to the pick-list" button.

You may add the names of new surface water bodies to the pick-list if it is incomplete as described above or from the "View / Enter / Edit Data" menu by selecting the "Surface Water Bodies" option (see Step 3).

If your total discharge to all media was less than one tonne for a Part 1A substance, you are not required to report your releases by environmental media and may report only a total discharge. Do not include water bodies that receive the general plant waste stream if this waste stream did not contain an NPRI substance or if reportable acids in the waste stream have been neutralized to a pH of 6.0 or greater prior to release.

B12.4 Releases to Land

Report all releases of the NPRI substance to land **within** the boundaries of your facility, the basis of the estimate and the detail code, if applicable. Do not report land disposal at an off-site location in this field. Transfers of the substance for disposal are reported in B20.0.

B12.4.a **Landfill** – For the purposes of the NPRI, on-site landfilling is classified as a release. If the substance was transferred off site for disposal, enter the quantity in field B22.1.e, subset i) "Containment/Landfill".

B12.4.b **Land treatment** – Land treatment is a disposal method in which a waste containing a listed substance is applied onto or incorporated into soil. If the substance is transferred off site for disposal, enter the quantity in field B22.1.h "Land Treatment".

B12.4.c **Spills** – Releases classified as spills include any accidental release of a listed substance to land at your facility.

B12.4.d **Leaks** – Leaks differ from spills in that they are chronic events that occur over a comparatively long time. This includes leaking underground storage tanks.

B12.4.e **Other** – Releases to land could occur in forms other than those specified above, for example, encapsulation prior to on-site landfill.

B12.5 Total Quantity Released

The electronic form will calculate the sum of the on-site releases reported in fields B12.1 through B12.4 and place this total into field B12.5. If you choose to report only a total release of less than one tonne to all media for **an NPRI Part 1A substance only** (B11.1), enter the quantity, the basis of the estimate and the detail code, if applicable.

If you are reporting for a CAC substance, this field will display the total quantity released to air (i.e., the sum of fields B12.1.a to B12.1.e).

B13.0 Breakdown of Releases by Percentage

This field is intended for facilities that have seasonal fluctuations in their releases. Releases for the four quarters of the year must total 100%. If you are reporting for a CAC substance, you will be required to enter a monthly breakdown of releases to air. Percentage releases for the 12 months must total 100%.

B14.0 Reasons for Changes in Quantities Released from Previous Year

Select one or more reasons why the on-site releases of the NPRI substance changed since 2001. This section must be completed, even if there were no on-site releases. You may use the "Comments" field to elaborate on your reasons. If this is your first reporting year, select B14.1.i "Not applicable". Some of the reasons for change may also be considered as pollution-prevention activities. If you have selected B14.1.c "Pollution-prevention activities", you must also complete section B30.0, "Pollution-Prevention Activities".

B14.1.a Changes in production levels – A change in on-site releases may be the result of changes in production levels or some other activity at the facility. Changes in production levels can be caused by increased sales, a change in the economy affecting the facility, a strike or other plant closure, expansion or conversion of the facility, etc. Other examples are given in section B40.0, "Production Ratio and Activity Index", in which you have the option to provide a quantitative measure of the year-to-year fluctuations in production levels and on-site releases.

B14.1.b Changes in estimation methods – Choose this item if there was a change in the method of estimating the quantity of the NPRI substance transferred off site. For example, engineering estimates may have been replaced by direct measurement. Or, the engineering calculations were updated or corrected.

B14.1.c Pollution-prevention activities – If chosen, you must describe the pollution-prevention activities in section B30.0. Refer to that section for examples of pollution-prevention activities. Pollution prevention does not include on-site treatment (pollution control) or off-site recycling or disposal.

B14.1.d Changes in on-site treatment – Examples include modification to, or addition of, new pollution-control devices, redirection or elimination of waste streams, expanded on-site recycling and other changes in on-site waste treatment.

B14.1.e Changes in off-site transfers for disposal – If chosen, you must report the off-site transfers for disposal in sections B20.0, B21.0, B22.0, B23.0 and B24.0.

B14.1.f Changes in off-site transfers for recycling – If chosen, you must report the off-site transfers for recycling in sections B20.0, B21.0, B25.0, B26.0 and B27.0.

B14.1.g Other – Some examples include accidents, spills or breakdowns. Provide details in field B14.2 "Comments".

B14.1.h No significant change (i.e., < 10%) or no change – Choose this item if there has been no change or if the change was less than 10% from the previous year.

B14.1.i Not applicable – Choose this item if this is the first year you are reporting this substance.

B14.2 Comments (Releases)

Comments specific to the releases of this substance may be provided in this field. For example, provide details of a spill which dramatically affected the release of this substance. The comments will appear in the NPRI database available to the public and are an opportunity to provide context for the information reported to the NPRI.

B15.0 Anticipated Releases

Enter your estimates of total releases to all environmental media, for the years 2003, 2004 and 2005. Estimates for the years 2006 and 2007 are optional (select "Not applicable" if you do not want to make an entry). Factors that should be considered when making these estimates include future production levels, product or process changes, pollution-prevention measures, addition of pollution-control equipment, etc.

Off-site Transfers for Disposal or Recycling

Disposal and recycling activities are considered together under the common heading of off-site transfers. The reporting categories are based on the International Waste Identification Code (IWIC) (Environment Canada, 1993) developed by the Organization for Economic Cooperation and Development (OECD). Reporting is limited to those categories which are most applicable to NPRI reporters. Those who report under the *Export and Import of Hazardous Wastes Regulations (EIHWR)* (*Canada Gazette*, 1992) will recognize the format. Even if you do not handle hazardous wastes, the reporting format will enable you to describe your transfers more accurately.

"**Disposal**" is final disposal of the material (e.g., landfill) or storage and treatment (e.g., stabilization) prior to final disposal. "**Recycling**" refers to activities that keep a material or a component of the material from becoming a waste destined for final disposal. Recyclable materials may be cleaned, regenerated or reprocessed to their original specifications and reused for their original purpose or used for an entirely different purpose without any pretreatment or modification. Components may be recovered or reclaimed from the recyclable material or the material may be used as a fuel for energy recovery. The recyclable material may be used in the manufacture of another product. For the purposes of the NPRI, recycling also includes substances sent back to the manufacturer or supplier for reprocessing, repackaging, resale or for credit or payment.

B20.0 Transfers of the Substance to Off-site Locations

Indicate if you transferred the NPRI substance to off-site locations for disposal or recycling by selecting either "Yes" or "No" in fields B20.1 and B20.2, respectively. Depending on your selection, the software will automatically skip certain sections of the report. However, even if you did not transfer NPRI substances off site, you must still provide reasons for changes in quantities disposed/recycled and anticipated transfers for disposal/recycling (B23.0, B24.0, B26.0 and B27.0). You will also be able to provide comments on your transfers for disposal and your recycling activities in fields B23.2 and B26.2.

B21.0 Reasons why Substances were Transferred Off Site for Disposal or Recycling

Select one or more reasons why the NPRI substance or why a material containing the NPRI substance was transferred off site for disposal or recycling. **This category does not include on-site disposal or recycling.** Equivalent IWIC Q-codes are listed in brackets after each item. Choose one or more of the following reasons:

B21.1.a Production residues – These are, for example, residues of industrial processes such as slags and still bottoms, residues from raw material processing such as mining residues and oil field slop. [Corresponds to codes Q1, Q8 and Q11 in the IWIC]

B21.1.b Off-specification products – These are products that were not suitable for commercial distribution or that could not be used by the facility and were destined for final disposal, reuse or recycling by another facility. [Corresponds to code Q2 in the IWIC]

B21.1.c Expiration date passed – Products for which the date for appropriate use expired and that were transferred off site for final disposal or reuse or recycling by another facility. [Corresponds to code Q3 in the IWIC]

B21.1.d Contaminated materials – For example, materials spilled or having undergone other mishap, including any materials contaminated as a result of the mishap; materials contaminated or soiled as a result of planned actions such as residues from cleaning operations, packing materials, containers, etc.; contaminated substances that no longer performed satisfactorily such as contaminated acids, solvents, exhausted tempering salts, etc.; adulterated materials. [Corresponds to codes Q4, Q5, Q7 and Q12 in the IWIC]

B21.1.e Unusable parts or discards – Describes items such as reject batteries, exhausted catalysts, etc. [Corresponds to code Q6 in the IWIC]

B21.1.f Pollution-abatement residues – Materials such as scrubber sludges, baghouse dusts, spent filters, etc., generated by pollution controls and on-site waste treatment. [Corresponds to code Q9 in the IWIC]

B21.1.g Machining or finishing residues – This includes lathe turnings, grinding dusts, sheet metal cuttings, mill scales, etc. [Corresponds to code Q10 in the IWIC]

B21.1.h Site-remediation residues – Materials, substances or products resulting from remedial actions with respect to contaminated land. [Corresponds to code Q15 in the IWIC]

B21.1.i Other – Any materials, substances or products not described above.

B22.0 Off-site Transfers for Disposal

In this section, report the quantity of the NPRI substance transferred to off-site locations for final disposal or storage and treatment prior to final disposal. If the reporting criteria are met for a listed substance, **all** off-site transfers of that substance for disposal must be reported **regardless of the concentration or amount**. Report the quantity of the NPRI substance that was sent to an off-site treatment facility and not the total weight of the mixture containing that substance. Report transfers to the first off-site location only and identify its name and location. You are not required to report any subsequent transfers by the waste disposal company. However, you must report the disposal method used. Disposal includes storage and treatment (e.g., stabilization) prior to final disposal. Do not report materials containing the NPRI substance which were recycled off site; they are reported in section B25.0.

Do not report off-site transfers of mineral acids if the acid had been neutralized to a pH of 6.0 or greater *prior to* its transfer off site for final disposal. In the case of nitric acid, the quantity of neutralized nitric acid would be reported as "nitrate ion in solution at a pH of 6.0 or greater".

For each disposal activity chosen, enter a "Basis of Estimate" code. Selecting "NA" (Not applicable) indicates that there were no transfers from your facility for this disposal activity. Enter the letter code identifying the method that applies to the largest portion of the estimated transfers. A pick-list is available in each field for choosing the "Basis of Estimate" codes.

"Detail" codes are required and available only for dioxins/furans and HCB substance reports. A "Detail" code is required only if the release, disposal or recycling data were obtained through direct measurement or monitoring (code "M" in the "Basis of Estimate" field). The "Detail" code is used to indicate if your measured concentrations were above, equal to or below the LoQ.

B22.1 Disposal Method

Eight major off-site disposal methods are identified. Report the exact amounts of the NPRI substance transferred for that disposal method, the basis of the estimate and the detail code, if applicable. Facilities can obtain information about the ultimate treatment/disposal of their transfers by looking at their invoices, waybills, waste manifests or by contacting the transfer facility.

B22.1.a Physical treatment – e.g., drying, evaporation, encapsulation or vitrification.

B22.1.b Chemical treatment – e.g., precipitation, stabilization or neutralization.

B22.1.c Biological treatment – e.g., bio-oxidation or composting.

B22.1.d Incineration/thermal – This differs from energy recovery. Incineration occurs when the substance or the material containing the substance does not have sufficient fuel value to contribute toward energy recovery.

B22.1.e Containment – Two forms of containment are identified:

i) landfill

ii) other storage

B22.1.f Municipal Sewage Treatment Plant (MSTP) – Report discharges of the NPRI substance to a municipal sewer system, regardless of the level of treatment provided by the MSTP.

B22.1.g Underground injection – Report quantity injected underground at an off-site location.

B22.1.h Land treatment – Report the quantity transferred off site for the purpose of land application or land farming.

You must identify the off-site facilities which received the NPRI substance for disposal. If the transfer was split among several off-site facilities, specify the quantity of the NPRI substance that was transferred to each facility. Select the button in the "# of Off-sites" column to open a screen that allows you to attribute all or a portion of the identified transfer of a substance to an off-site facility. The software provides a pick-list of off-site facility names that is drawn from previously entered off-site facilities. The pick-list is sorted by province. If the off-site facility to which you transferred is not on the pick-list, you can add to the list by selecting the "Add a NEW Off-site to the pick-list" button.

You may add the names of new stacks to the pick-list if it is incomplete as described above or from the "View / Enter / Edit Data" menu by selecting the "Off-site Facilities" option (see Step 3).

B22.2 Total Quantity Disposed

The reporting software calculates the sum of the entries made in field B22.1 and places the result into this field.

B23.0 Reasons for Changes in Quantities Disposed from Previous Year

Select one or more reasons why off-site transfers for disposal of the NPRI substance have changed since 2001. This section must be completed, even if there were no off-site transfers. You may use the "Comments" field to elaborate. If this is your first reporting year, select B23.1.i for "Not applicable". Some of the reasons for change may also be considered pollution-prevention activities. If you have selected B23.1.c "Pollution-prevention activities", you must also complete section B30.0, Pollution-Prevention Activities. The reasons for changes include:

B23.1.a **Changes in production levels** – A change in off-site transfers for disposal may be the result of changes in production levels or some other activity at the facility. Changes in production levels can be caused by increased sales, a change in the economy affecting the facility, a strike or other plant closure, expansion or conversion of the facility. Other examples are given in section B40.0, Production Ratio and Activity Index, where you have the opportunity to provide a quantitative measure of the year-to-year fluctuations in production levels and off-site transfers.

B23.1.b **Changes in estimation methods** – Choose this item if there was a change in the method of estimating the quantity of the NPRI substance transferred off site. For example, engineering estimates may have been replaced by direct measurement or the engineering calculations may have been updated or corrected.

B23.1.c **Pollution-prevention activities** – If chosen, you must describe the pollution-prevention activities in Section B30.0. Refer to that section for examples of pollution-prevention activities. Pollution prevention does not include on-site treatment (pollution control) or off-site recycling or disposal.

B23.1.d **Changes in on-site treatment** – Examples include modification to or addition of new pollution-control devices, redirection or elimination of waste streams, expanded on-site recycling and other changes in on-site waste treatment.

B23.1.f **Changes in off-site transfers for recycling** – If chosen, you must report the off-site transfers for recycling in sections B20.0, B21.0, B25.0, B26.0 and B27.0.

B23.1.g **Other** – Some examples include site remediation, accidents, spills or breakdowns which affect the quantity of the NPRI substance transferred off site for disposal. Provide details in field B23.2 "Comments".

B23.1.h **No significant change (i.e., <10%) or no change** – Choose this item if there has been no change or if the change was less than 10% from the previous year.

B23.1.i **Not applicable** – Choose this item if this is the first year reporting this substance.

B23.2 Comments (Disposal)

Comments specific to the off-site disposal of this substance may be provided in this section. For example, give details of a one-time site remediation which dramatically affected the off-site transfers of this substance. The comments will appear in the NPRI database available to the public and are an opportunity to provide context for the information reported to the NPRI.

B24.0 Anticipated Disposals

Enter your estimate of total transfers of the listed substance for disposal to off-site facilities for the years 2003, 2004 and 2005. Years 2006 and 2007 are optional fields (select "Not applicable" if you do not want to make an entry). Factors that should be considered when making these estimates include future production levels, product or process changes, pollution-prevention measures, addition of pollution-control equipment, site remediations, etc. This section must be completed, even if there were no off-site transfers.

B25.0 Off-site Transfers for Recycling

"Recycling" refers to activities that keep a material or a component of the material from becoming a waste destined for disposal. Recyclable materials may be cleaned, regenerated or reprocessed to their original specifications and reused for their original purpose. They may also be used for an entirely different purpose without any pretreatment or modification. Components may be recovered or reclaimed from the recyclable material or the material may be used as a fuel for energy recovery. The recyclable material may be used in the manufacture of another product. For the purposes of the NPRI, recycling also includes substances sent back to the manufacturer or supplier for reprocessing, repackaging, resale or for credit or payment. Report only the net weight of the NPRI substance transferred off site for recycling, and **not the total amount of the mixture containing the substance**. For example,

your facility submits an NPRI report for zinc. It sends zinc-coated steel for recycling to an off-site recycler. In this case, you must report the net weight of the zinc and not the total weight of the zinc-coated steel.

Ten types of recycling operations are listed, based on those set out in Part II of Schedule III of the *Export and Import of Hazardous Wastes Regulations* and are used as part of the IWIC code to classify hazardous recyclables. Choose the recycling operation which best describes how the NPRI substance or material containing the NPRI substance was recycled. The NPRI substance is considered to be recycled even when only a portion of the material in which it is contained is recycled. This recognizes the fact that recycling may only recover certain valuable components. For example, only the valuable metals may be recovered from a wastewater treatment sludge from an electroplating operation.

For each recycling activity chosen, enter a "Basis of Estimate" code. Selecting "NA" (Not applicable) indicates that there were no transfers from your facility for this recycling activity. Enter the letter code identifying the method that applies to the largest portion of the estimated transfers. A pick-list is available in each field for choosing the "Basis of Estimate" codes.

"Detail" codes are required and available only for dioxins/furans and HCB substance reports. A "Detail" code is required only if the release, disposal or recycling data were obtained through direct measurement or monitoring (code "M" in the "Basis of Estimate" field). The "Detail" code is used to indicate if your measured concentrations were above, equal to or below the LoQ.

B25.1 Recycling Activity

Ten major off-site recycling activities are identified. Report the net amounts of the NPRI substance transferred for that recycling activity, the basis of the estimate and the detail code, if applicable.

B25.1.a Energy recovery – The NPRI substance or the material containing it has sufficient energy content (BTU value) to allow its use as a fuel for energy recovery. If there had been no attempt to recover energy from the material, report it as an off-site transfer for incineration. [Corresponds to code R1 in the IWIC]

B25.1.b Recovery of solvents – The recovery or regeneration of NPRI substances or materials containing NPRI substances that have been used as solvents. For example, distillation of methanol after solvent extraction to recover pure solvent methanol. [Corresponds to code R2 in the IWIC]

B25.1.c Recovery of organic substances (not solvents) – Recovery of other organic substances that are not used as solvents. [Corresponds to code R3 in the IWIC]

B25.1.d Recovery of metals and metal compounds – Choose this recycling activity when a pure metal or a metal compound was being recovered. The NPRI list of substances includes 20 metals/organometals: aluminum, antimony, arsenic, cadmium, chromium, hexavalent chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thorium, tetraethyl lead, titanium, vanadium and zinc. Some are listed as "(element) and its compounds" while others are listed as specific inorganic or qualified inorganic compounds. [Corresponds to code R4 in the IWIC]

B25.1.e Recovery of inorganic materials (not metals) – The NPRI list of substances contains the inorganic substances: ammonia, asbestos, boron trifluoride, bromine, carbon disulphide, chlorine, chlorine dioxide, fluorine, hydrazine, hydrogen sulphide, ionic cyanides, nitrate ion, phosphorus and sulphur hexafluoride. [Corresponds to code R5 in the IWIC]

B25.1.f Recovery of acids or bases – The following mineral acids are on the NPRI list: hydrochloric, nitric and sulphuric. This recycling activity also applies to the recovery of acids or bases that contain other NPRI substances as contaminants. [Corresponds to code R6 in the IWIC]

B25.1.g Recovery of catalysts – Choose this item if a catalyst containing an NPRI substance was transferred off site to be recovered, reactivated, regenerated or otherwise refurbished for reuse as a catalyst. Recovery of catalysts does not include the destruction of the catalyst to recover separate components. Choose B25.1.d if the catalyst was transferred off site for recovery of the metals in the catalyst. [Corresponds to code R8 in the IWIC]

B25.1.h Recovery of pollution-abatement residues – This includes the recycling of residues from pollution controls or site-remediation activities. [Corresponds to code R7 in the IWIC]

B25.1.i Refining or reuse of used oil – Lubricating oils are not on the NPRI list of substances. However, used oils are sometimes contaminated with NPRI substances, such as zinc additives. Choose this recycling activity if used oils containing NPRI substances were transferred off site for refining or reuse. If used oil was used as a fuel, choose B25.1.a. [Corresponds to code R9 in the IWIC]

B25.1.j Other – Other recovery, reuse and recycling activities not described above.

You must identify the off-site facilities which received the NPRI substance for recycling. If the transfer was split among several off-site facilities, specify the quantity of the NPRI substance that was transferred to each facility (see field B22.1 for instructions on using and editing the "Master Pick-list of Off-site Facilities" table).

B25.2 Total Quantity Recycled

The reporting software calculates the sum of the entries made in section B25.1 and places the result into this field.

B26.0 Reasons for Changes in Quantities Recycled from Previous Year

Indicate the changes, since 2001, in off-site transfers for recycling. This section must be completed, even if there were no off-site transfers. If this is your first reporting year, select B26.1.i for "Not applicable". Otherwise, select at least one of the following reasons for changes in quantities transferred. If you have selected B26.1.c "Pollution-prevention activities", you must complete section B30.0, Pollution-Prevention Activities. The reasons for changes include:

B26.1.a Changes in production levels – See field B23.1.a.

B26.1.b Changes in estimation methods – See field B23.1.b.

B26.1.c Pollution-prevention activities – See field B23.1.c.

B26.1.d Changes in on-site treatment – See field B23.1.d.

B26.1.e Changes in off-site transfers for disposal – If chosen, you must report the off-site transfers for disposal in sections B20.0, B21.0, B22.0, B23.0 and B24.0.

B26.1.g Other – See field B23.1.g.

B26.1.h No significant change (i.e., <10%) or no change – No change or a change of less than 10% from the previous year.

B26.1.i Not applicable – First year reporting this substance.

B26.2 Comments (Recycling)

Comments specific to the recycling of this substance may be provided in this section. The comments will appear in the NPRI database available to the public and are an opportunity to provide context for the information reported to the NPRI.

B27.0 Anticipated Recycling

Enter your estimate of total transfers of the listed substance for recycling for the years 2003, 2004 and 2005. Years 2006 and 2007 are optional fields (select "Not applicable" if you do not want to make an entry). This section must be completed, even if there were no off-site transfers.

B30.0 Pollution-Prevention (P2) Activities

Pollution prevention (P2) is defined as "the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to the environment or human health" (CEPA 1999). P2 seeks to eliminate the causes of pollution rather than managing it after it has been created. It encourages the kinds of changes that are likely to lead to lower production costs, increased efficiencies and more effective protection of the environment.

In this section, facilities that have taken measures to prevent the generation of NPRI pollutants and wastes are required to indicate what P2 activities they have implemented, for each substance. This section allows facilities to identify P2 activities that were newly implemented, in whole or in part, during the 2002 calendar year specifically for the substance being reported. If you are reporting for P2 activities that are not specific to a particular substance, or if you are providing information on P2 activities that were not newly implemented in 2002, identify these activities, along with the year in which they were implemented, in field A15.2, Comments (Pollution Prevention).

The opportunity to institute P2 measures can be identified in broad areas of an industrial operation, including material and resource feedstock, equipment and processes, operational practices, products and non-product outputs, and business management systems. **P2 activities may include:** materials or feedstock substitution; product design or reformulation; equipment or process modification; spill and leak prevention; on-site reuse, recovery or recycling; improved inventory management or purchasing techniques; and, good operating practices and training.

Some examples of **activities which are NOT considered pollution prevention** include on-site treatment (pollution control), off-site recycling, off-site disposal, waste treatment or dilution, and transferring hazardous and/or toxic constituents from one environmental medium to another.

Qualitative reporting of P2 activities is a mandatory reporting requirement of the NPRI. If you have not implemented a P2 program at your facility, choose item B30.1.i. Otherwise, identify all of the P2 activities you have implemented during the 2002 calendar year. If you selected "Pollution-prevention activities" in fields B14.1.c, B23.1.c or B26.1.c as a reason for changes in quantities released on site or transferred off site for disposal or recycling, you **must** identify the activity in this section.

B30.1.a Materials or feedstock substitution entails replacing materials used in the production process or embedded within a product, with non-polluting or less polluting materials or feedstock. Also referred to as source elimination, materials substitution aims to decrease or eliminate the quantity of toxic and/or hazardous materials used:

i) **Increased purity of materials** – The material or feedstock used in the production process was of greater purity to reduce the amount of the substance being emitted or produced as waste.

ii) **Substituted materials** – An alternative feedstock was used to achieve a reduction in emissions or waste of the substance.

iii) **Other (specify)** – If you are implementing materials or feedstock substitution other than those described above, provide details of this practice in the "Comments" field below (B30.1.a.iv).

iv) **Comments (specific to B30.1.a)** – Facilities are encouraged to provide additional information describing their materials or feedstock substitution initiatives and results achieved. Note that if you have selected "Other" (B30.1.a.iii), you must provide a description of the initiative in this field.

B30.1.b Product design or reformulation includes methods for preventing pollution associated with the entire life cycle (i.e., resource extraction, production, use and disposal) of products through the design of new products and the redesign or reformulation of old ones:

i) **Changed product specifications** – One or more of the characteristics or traits of the product were changed to prevent pollution associated with the product's production, use and disposal.

ii) **Modified design or composition** – The design or composition of existing products were modified to significantly reduce pollution.

iii) **Modified packaging** – Product packaging was modified to minimize the amount of the substance released or generated as waste.

iv) **Other (specify)** – If you are implementing product design or reformulation other than those described above, provide details of this practice in the "Comments" field below (B30.1.b.v).

v) **Comments (specific to B30.1.b)** – Facilities are encouraged to provide additional information describing their product design or reformulation initiatives and results achieved. Note that if you have selected "Other" (B30.1.b.iv), you must provide a description of the initiative in this field.

B30.1.c Equipment or process modification introduces new technologies or optimization approaches to existing operating systems, processes and practices to improve production efficiencies, resource utilization and reduce pollution generated and materials wasted:

i) **Modified equipment, layout, or piping** – The equipment, layout and/or piping at the facility was altered in order to reduce or eliminate the amount of pollution and waste of this substance (e.g., use of gravitational force for transferring material).

ii) **Used different process catalyst** – Part or all of the process was accelerated by replacing the substance being reported with a less- or non-toxic substance. This also includes instances in which the substance being reported was replaced by a catalyst which produced less- or non-toxic waste by-products.

iii) **Instituted better controls on operating bulk containers** – Through regulation and better management of the use of bulk containers, the amount of spillage and container residue containing the substance was reduced or eliminated.

iv) **Changed from small volume containers to bulk containers** – Increasing the size and carrying capacity of containers reduced residual waste and excess packaging, thus decreasing the amount of the substance that was released or generated as waste.

v) **Modified stripping/cleaning equipment** – Stripping/cleaning equipment was modified to utilize less- or non-toxic substances instead of the substance being reported (e.g., water-based cleaning solution).

vi) **Changed to mechanical stripping/cleaning devices** – The replacement of solvents with abrasive stripping/cleaning equipment eliminated, or significantly reduced, the amount of the substance released or generated as waste.

vii) **Changed to aqueous cleaners** – Solvent-based cleaners were replaced with aqueous (water-based) cleaning solutions, reducing the use of the substance or the amount of the substance released or generated as waste.

viii) **Modified or installed rinse systems** – A rinse system was installed or changed to screen and capture excess material for recovery and further use.

ix) **Improved rinse equipment design** – The efficiency and effectiveness of rinse equipment was improved to reduce the amount of the substance used in the cleaning process (including the installation of splash guards, sideboards, or counter-current rinse systems).

x) **Improved rinse equipment operation** – The operation of rinse equipment was modified to minimize once-through use, and spillage of the substance through an increased degree of care and efficiency in handling procedures.

xi) **Modified spray systems or equipment** – Spray systems or equipment was modified to reduce emissions of the substance (including the avoidance of over-spray, switching to water-based products, and ensuring controls were set appropriately).

xii) **Improved application techniques** – Application techniques were improved to augment the focus and control (e.g., maintaining proper types of nozzles, spray distances, pressure and speed), limiting or eliminating the accidental emission or waste of the substance.

xiii) **Changed from spray to other system** – Spray system was replaced with another mechanism or system to limit or eliminate the emission or waste of the substance.

xiv) **Other (specify)** – If you are implementing an equipment or process modification other than those described above, provide details of this practice in the "Comments" field below (B30.1.c.xv).

xv) **Comments (specific to B30.1.c)** – Facilities are encouraged to provide additional information describing their equipment or process modifications and results achieved. Note that if you have selected "Other" (B30.1.c.xiv), you must provide a description of the initiative in this field.

B30.1.d Spill and leak prevention improves inventory controls and reduces or eliminates the amount of the substance and its waste that accidentally escapes storage and transportation facilities:

i) **Improved storage or stacking procedures** – Improved storage and stacking procedures reduced the quantity of the substance lost through a leaking storage system and/or unstable stacking techniques.

ii) **Improved procedures for loading, unloading, and transfer operations** – Improved techniques for loading, unloading and transferring materials were employed at the facility to improve ground protection and reduce or eliminate the amount of the substance emitted.

iii) **Installed overflow alarms or automatic shut-off valves** – Overflow alarms or automatic shut-off valves were installed to reduce the amount of spillage and waste of the substance.

iv) **Installed vapour-recovery systems** – A vapour-recovery system was installed to capture and contain, for the purpose of reuse, any air emissions of the substance that escaped throughout the production process.

v) **Implemented inspection or monitoring program of potential spill or leak sources** – Regular monitoring and testing of leak, including fugitive emissions, and spill sources was conducted on all process devices, increasing productivity and preventing loss.

vi) **Modified containment procedures** – Containment procedures were changed to limit emissions and loss of the substance from storage units (including emissions from volatile compounds).

vii) **Improved draining procedures** – Drainage procedures were improved to ensure that the substance was not released from containment, storage systems and process equipment. This included ensuring that the substance being drained was properly managed (e.g., storm system protection).

viii) **Other (specify)** – If you are implementing spill and leak prevention mechanisms other than those described above, provide details of this practice in the "Comments" field below (B30.1.d.ix).

ix) **Comments (specific to B30.1.d)** – Facilities are encouraged to provide additional information describing their spill and leak prevention initiatives and results achieved. Note that if you have selected "Other" (B30.1.d.viii), you must provide a description of the initiative in this field.

B30.1.e **On-site reuse, recycling or recovery** covers the processes of reusing, recycling or recovering materials **at the same facility** where an activity has taken place. Reuse is the re-employment of products or materials in their original form or in new applications, with refurbishing to original or new specifications as required. Recycling is the extension of the effective life span of renewable and non-renewable resources through changes to processes or practices and the addition of energy inputs. Recovery is the process of diverting material, waste product or by-product from loss and restoring it to usefulness:

i) **Instituted recirculation within a process** – Products, substances and/or catalysts were recirculated within a process or in additional processes to improve efficiency, reduce or eliminate emissions and waste of the substance or improve resource utilization through on-site recycling, reuse or recovery.

ii) **Other (specify)** – If you are implementing on-site reuse, recycling and recovery activities other than the one described above, provide details of this practice in the "Comments" field below (B30.1e.iii).

iii) **Comments (specific to B30.1.e)** – Facilities are encouraged to provide additional information describing their on-site reuse, recycling or recovery initiatives and results achieved. Note that if you have selected "Other" (B30.1e.ii), you must provide a description of the initiative in this field.

B30.1.f **Improved inventory management or purchasing techniques** include building environmental considerations into the purchasing process as well as inventory management of products:

i) **Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life** – Processes were instituted to ensure that inventories were not purchased ahead of immediate needs.

ii) **Initiated testing of outdated material** – Outdated materials were tested to assess usefulness.

iii) **Eliminated shelf-life requirements for stable materials** – Shelf-life requirements were eliminated by substituting stable materials to avoid the unnecessary disposal of the substance.

iv) **Instituted better labelling procedures** – More effective labelling processes were instituted to ensure that only truly-expired products were discarded.

v) **Instituted clearinghouse to exchange materials** – A clearinghouse of materials was established to reduce waste by making unwanted goods and substances available to others who might have a use for them, thus averting disposal of the substance.

vi) **Instituted improved purchasing procedures** – Improved purchasing procedures were instituted to reduce waste by ensuring that environmental factors were taken into consideration during purchasing (e.g., purchased materials were recyclable or reusable).

vii) **Other (specify)** – If you are implementing improved inventory management or purchasing techniques other than those described above, provide details of this practice in the "Comments" field below (B30.1.f.viii).

viii) **Comments (specific to B30.1.f)** – Facilities are encouraged to provide additional information describing their improved inventory management or purchasing techniques and results achieved. Note that if you have selected "Other" (B30.1.f.vii), you must provide a description of the initiative in this field.

B30.1.g **Good operating practices or training** can often improve operating efficiencies and provide a cost-effective way to prevent pollution, reduce costs and improve quality. These multiple objectives can often be achieved through basic improvements in work procedures, and through training and encouraging staff to improve material handling and to recognize P2 opportunities:

i) **Improved maintenance scheduling, record keeping or procedures** – Improved maintenance scheduling, record keeping or procedures were instituted to reduce the amount of the substance released or waste generated as a result of faulty or unmaintained equipment, as well as assuring that the records were reflective of all operating practices, waste generation, emissions and process improvements.

ii) **Changed production schedule to minimize equipment and feedstock changeovers** – The production schedule was changed to minimize equipment and feedstock changeovers, thus reducing the emission and waste of this substance accumulated from cleaning between changeovers.

iii) **Training related to pollution prevention** – Employees, both new and existing, were educated about P2 goals related to this substance and how to fulfil their responsibilities. Appropriate training provided employees with the knowledge and skills required to identify and implement P2 practices for this substance.

iv) **Other (specify)** – If you are implementing good operating practices or P2 training other than those described above, provide details of this practice in the "Comments" field below (B30.1.g.v).

v) **Comments (specific to B30.1.g)** – Facilities are encouraged to provide additional information describing their good operating practices or training initiatives and results achieved. Note that if you have selected "Other" (B30.1.g.iv), you must provide a description of the initiative in this field.

B30.1.h Other (specify) – If you are implementing a P2 activity for this substance, other than those described above, provide details of this activity in the P2 comment field (B30.2).

B30.1.i No new pollution-prevention activities – No new P2 activities were implemented at your facility during the 2002 calendar year for this substance.

B30.2 Comments (Pollution Prevention)

Facilities are encouraged to provide additional information describing P2 initiatives related to the reported substance, that have been implemented during the year, including results achieved (e.g., environmental results, economic benefits, etc.). The comments will appear in the NPRI database available to the public and are an opportunity to provide context for the information reported to the NPRI. Information on general, facility-wide P2 activities, such as water- and energy-conservation initiatives, or P2 activities that were newly implemented in a year other than 2002, should be entered in the facility "Comments (Pollution Prevention)" field (A15.2).

B40.0 Production Ratio and Activity Index (optional)

This section allows facilities, on a voluntary basis, to show the relationship between year-to-year fluctuations of their production levels and the relative decrease or increase in the sum of their on-site releases plus off-site transfers of the reported substance.

A "production ratio" is the ratio of "reporting-year production" to "prior-year production" that will permit year-to-year comparisons of changes in the total on-site releases plus off-site transfers. An "activity index" is based on a variable, other than production, that is the primary influence on the total, and that will in turn permit comparison of changes from year to year. While the use of a production ratio or activity index is not practical for some facilities, it does provide a means for facilities to report useful information to better understand trends in on-site releases and off-site transfers in a simple numerical format. Because changes in total on-site releases and off-site transfers may be the result of changes in production levels, a production ratio or activity index would help indicate, relatively speaking, whether a facility has, in fact, improved (or worsened) its environmental performance.

You are encouraged to provide a "ratio" of reporting-year production to prior-year production, or an "activity index" based on a variable other than production that was the primary influence on the total quantity of the reported substance released on site or transferred off site for final disposal or recycling. The ratio or index should be reported to two decimal places (i.e., two digits to the right of the decimal point). If the manufacture, processing or other use of the reported substance began during the current reporting year, enter "NA" (Not applicable) as the production ratio or activity index.

It must be noted that if your facility reports more than one substance, the production ratio or activity index may vary between substances. For facilities that manufacture the reported substance, the quantities produced in the current and previous year provide a good basis for the ratio because that is the primary business activity associated

with the substance. However, in most cases, the production ratio or activity index must be based on some variable of production or activity rather than on the amount of substance manufactured, processed or otherwise used.

Select, from the following examples, the production ratio or activity index that is the most appropriate method of adjusting the sum of on-site releases plus off-site transfers of the reported substance. If your facility reports more than one NPRI substance, the production ratio or activity index may vary from substance to substance. However, for a given substance, the same method of calculating a production ratio or activity index must be used from year to year to allow comparison. If the substance was used in more than one production process, you must use a production ratio that is based on a weighted average of the individual production ratios. If this is the first year reporting a substance, enter "NA" (Not applicable) in field B40.1.

Determining a Production Ratio

The production ratio must be based on the variable that most directly affects the quantities of the substance released on site or transferred off site for final disposal or recycling. Examples of methods available include:

- amount of the substance manufactured divided by the amount of the substance manufactured in the preceding year, or
- amount of product produced divided by the amount of product produced in the preceding year.

Example 1

Your facility manufactured the reported NPRI substance and you have instituted a pollution-prevention program to reduce fugitive emissions of the substance during manufacture, storage, packaging and shipping. An appropriate production ratio would simply be the amount of the substance manufactured during the reporting year divided by the amount manufactured in the previous year.

Example 2

Your facility's only use of toluene was as a paint carrier for a painting operation. You painted 12 000 refrigerators in the current reporting year and 10 000 refrigerators during the preceding year. In this case, the production ratio for toluene was 1.2 (12 000 ÷ 10 000) because the number of refrigerators produced is the primary factor determining the quantity of toluene to be reported.

Example 3

A facility manufactured inorganic pigments, including titanium dioxide. Hydrochloric acid was produced as a waste during the production process. An appropriate production ratio for hydrochloric acid is the annual titanium dioxide production, not the amount of hydrochloric acid generated. During the reporting year, 20 tonnes of titanium dioxide was manufactured. If the facility produced 26 tonnes in the preceding year, the production ratio would be 0.77 (20 ÷ 26).

Determining an Activity Index

In some situations, an activity other than production is the primary influence on the total quantity of the reported substance released on site or transferred off site for final disposal or recycling.

Example 1

Your facility manufactured organic dyes in a batch process. Different colours of dyes were manufactured and, between colour changes, all equipment had to be thoroughly cleaned with solvent containing glycol ethers to reduce colour carryover. During the preceding year, the facility manufactured four different colours in separate batches, totalling 15 tonnes. During the reporting year, the facility manufactured two colours, in separate batches, totalling 20 tonnes. Since the main activity affecting usage of the glycol ether was the cleaning associated with colour changeovers, the activity index would be 0.5 (2 colour changeovers in reporting year ÷ 4 colour changeovers in previous year). The total quantity of dye manufactured has no bearing on the usage of the glycol ethers and, therefore, is inappropriate for normalizing your facility's annual changes in releases and transfers.

Example 2

A facility that manufactures thermoplastic composite parts for aircraft used toluene as a wipe solvent to clean moulds. The moulds were cleaned on an as-needed basis that was not necessarily a function of the parts' production rate. Operators cleaned 5 200 moulds during the reporting year, but only cleaned 2 000 molds in the previous year. An activity index of 2.6 (5 200 ÷ 2 000) represents the activities involving toluene usage in the facility.

If the moulds were cleaned regularly after every 1 000 parts were manufactured, the production ratio would be equal to the activity index and either could be used.

Example 3

A facility manufactured surgical instruments and cleaned the metal parts with 1,1,1-trichloroethane in a vapour degreaser. The degreasing unit is operated in a batch mode and the metal parts were cleaned according to an irregular schedule. The activity index can be based upon the total time the metal parts were in the degreasing operation. If the degreasing unit operated 3 900 hours during the reporting year and 3 000 hours the previous year, the activity index would be 1.3 (3 900 ÷ 3 000).

Determining a Production Ratio Based on a Weighted Average

At many facilities, an NPRI substance is used in more than one production process. In these cases, a production ratio or activity index can be estimated by weighting the production ratio for each process based on the respective contribution of each process to the quantity of the substance released or transferred off site for final disposal or recycling.

Example

Your facility painted bicycles with paint containing toluene. Sixteen thousand (16 000) bicycles were produced in the reporting year and 14 500 were produced in the previous year. There were no significant design modifications that changed the total surface area to be painted for each bicycle. The production ratio would be 1.1 (16 000 ÷ 14 500). You estimate that 12.5 tonnes of toluene were released on site or transferred off site for final disposal or recycling as a result of bicycle production. Your facility also used toluene as a solvent in a glue that was used to make components and add-on equipment for the bicycles. Thirteen thousand (13 000) components were manufactured in the reporting year, compared to 15 000 in the previous year. The production ratio for the components using toluene was 0.87 (13 000 ÷ 15 000). You estimate that 1.0 tonne of toluene was released on site or transferred off site for final disposal or recycling as a result of components' production. A production ratio can be calculated by weighting each of the production ratios based on the relative contribution each has on the quantities of toluene (13.5 tonnes during the reporting year) released on site or transferred off site for final disposal or recycling. The production ratio would be calculated as follows:

$$\text{Production ratio} = \left(\frac{12.5}{13.5} \times 1.1\right) + \left(\frac{1.0}{13.5} \times 0.87\right) = 1.08$$

You now have completed the 2002 reporting form for this substance. You have the options of saving the substance information, cancelling the changes or returning to the substance report.

Return to the "Substance Summary Listing" screen to add or modify any substances related to your facility. To add a new facility or review facility information already entered, return to the "View / Enter / Edit Data" screen and select the "Reporting Facilities" button. From this menu, you can enter more substances for this facility or enter other facilities and other substances.

When all substance and facility information has been entered, proceed to Step 6.

Step 6 – Check errors and create export data file

Check for Reporting Errors

This step is mandatory. The reporting software will not create an export file until no errors are detected when this function is run.

This function will verify that you have correctly completed all sections of the report required for the program(s) you selected. A status screen will indicate the number of facility and substance records being verified and the number of warnings and errors found. The reporting software has data-verification features to provide warnings if the reported releases and transfers are unusually large. Warnings will not prevent the generation of the export file. If errors or warnings are found, you will be prompted to view the error and warning messages.

From the "Main Menu", select the "Check Errors / Create Export" option and then select the "Check for Reporting Errors" function to check your NPRI report for errors. If no errors are detected by this function, then select the "Create an Export Data File" option to create an export file that you can then send via e-mail or floppy disk to the appropriate inventory authority.

CHECK ERRORS / CREATE EXPORT

- Check for Reporting Errors
- View / Print Reporting Errors
- Create an Export Data File

View / Print Reporting Errors

Use this function to review the error and warning messages generated by the software. The error and warning messages identify the field in which the error occurred and provide a brief description of the error or warning. For example:

YEAR	NPRI ID	COMPANY NAME	CAS NO.	SUBSTANCE	REF.	FIELD NAME
ERROR MESSAGE						
ERRORS DETECTED						
YOU MUST GENERATE A NEW LIST OF POSSIBLE ERRORS AFTER YOUR CORRECTIONS.						
2002	5199	ABC MANUFACTURING	7782-50-5	CHLORINE	B 2.0	NATURE OF ACTIVITIES
SPECIFY EITHER MANUFACTURE, PROCESS OR OTHERWISE USE OF THE SUBSTANCE.						
2002	5199	ABC MANUFACTURING	7782-50-5	CHLORINE	B14.1	REASONS FOR CHANGE
PLEASE SPECIFY EITHER A, B, C, D, E, F, G, H OR I AS A REASON FOR CHANGE.						
2002	5199	ABC MANUFACTURING	7782-50-5	CHLORINE	B30.1	POLLUTION PREVENTION
SPECIFY EITHER A, B, C, D, E, F, G, H OR I AS A REASON FOR CHANGE.						

If errors were detected, return to the "View / Enter / Edit Data" screen, select either the "Reporting Facilites" or "Substances" button and correct the errors identified in the error message. You must then rerun the "Check for Reporting Errors" function to clear the previous error codes. When you receive the message "No Errors Detected", you will be able to create the appropriate export file.

Create an Export Data File

To export your data, select "Create an Export Data File" on the "Check Errors / Create Export" menu. Read the "Create an Export Data File" screen carefully. You must generate a separate export file for each organization to which you are required to submit a report. Select the organization from the pick-list:

- EC - reporting to one or more of NPRI, ARET 2, EPA, AENV
- ON MOE - reporting under O.Reg.127/01
- NERM - reporting to NERM

Press "Continue". A summary screen will be displayed so you can review the data you have entered for the selected inventory program(s).

Review the facility information and substance(s) data included in your report(s) carefully. Check that you reported your values in the correct units. If you reported to the NPRI for 2001, compare your data from 2001 to that in your 2002 report. Ensure that any significant changes in quantities reported from year to year are correct and not the result of a calculation error or the use of wrong units.

After review, identify the destination for the export file – either a diskette or a folder on your hard drive. The default directory is **C:\Program Files\NPRI-INRP\2002\Exports**. Press "Continue" for the export file to be created. Select the "Print Statement of Certification" button for the appropriate inventory*.

Repeat the above steps for each applicable organization to which you are required to submit a report.

If you would like to generate an export file for your company coordinator or for import into next year's reporting software, select the "ALL" option from the pick-list. This file also serves as a means to backup all data you have entered.

Do not use other database programs to alter the data after export. Once altered, the data will be rendered invalid and will require resubmission of your report.

When you have exported your NPRI data and printed your Statement of Certification, proceed to Step 7.

* The printing function of this software uses a fixed font to generate reports. For this reason, it is advisable that you go to the "Print Menu" of the "Main Menu" to adjust the printer defaults and do a few trial prints of a document.

Step 7 – Sign the Statement of Certification and submit the report

Sign the Statement of Certification

When submitting your NPRI report, you must include a signed Statement of Certification. The statement should be signed by the same person identified as the "Company Official" for the facility in section A16.0.

Submitting an NPRI Report by E-mail

NPRI reports submitted by e-mail and the signed Statement of Certification must be electronically postmarked **no later than June 1, 2003**.

If you choose to submit your NPRI report by e-mail:

- Use the NPRI software to export the NPRI report to a floppy disk or a directory (folder) on your hard drive as described in Step 6. Do not copy the files that are in the NPRI software directory. A complete NPRI report consists of a single file – **EXPO_EC.MDB** (Other export options will create files such as EXPO_ALL.MDB, EXPONERM.MDB or EXPO_MOE.MDB for submission to other organizations. These files will normally be found in the default directory **C:\Program Files\NPRI-INRP\2002\Exports**.)
- Send this file as an attachment to an e-mail to your regional NPRI office. In the subject line, clearly indicate that it is an NPRI report and **include the NPRI ID number** for your facility and the name of your company. Company coordinators are reminded that they are only required to send one NPRI report to the NPRI office in their region. In your e-mail message, include your name, address, telephone and facsimile numbers and e-mail address. Retain a copy of this e-mail for future reference.
- Your signed Statement of Certification (SoC) must be sent by facsimile to the same NPRI office to which you sent the e-mail message. As an alternative, you can scan your signed SoC and submit it electronically to the same NPRI office. Keep the original on file for future reference. **Your report is considered incomplete** until the signed SoC and the NPRI reports have been received by Environment Canada. Both the SoC and the e-mail message must be electronically postmarked on or before June 1, 2003.

If you need assistance, contact your regional NPRI office listed on the inside front cover of this Guide.

Submitting an NPRI Report by Postal Mail or Courier

Send a floppy disk or CD-ROM containing your NPRI export data file and the signed Statement of Certification to your regional NPRI office, postmarked or courier-dated **no later than June 1, 2003**.

DO NOT provide a printed copy of the report with your disk.

Where disks contain NPRI reports for facilities in different regions of Canada, company coordinators are reminded that they are only required to send one NPRI report to the NPRI office in their region. For example, a company coordinator in Montreal, reporting to the NPRI for facilities in Edmonton, Vancouver and Toronto, is asked to send the NPRI reports to the NPRI regional office in Montreal.

Although rare, computer viruses have been detected on report disks submitted to the NPRI. If your disk is infected, you will be required to resubmit your report.

After making a copy on a floppy disk, slide the tab to open the "write protect" window on the corner of your 3.5" disk. If a CD-ROM was used, be sure to close the disk so that no more additions can be made.

Indicate on your disk the **name of your facility, NPRI ID number** (provided with the reporting package) and the **date of submission**. First-time reporters who have not received a permanent NPRI ID number can use the temporary ID number (e.g., 9000000001) generated by the software.

If you need assistance, contact your regional NPRI office listed on the inside front cover of this Guide.

NOTE: Some facilities in Ontario submitted their NPRI report to Ontario Ministry of Environment offices. Facilities in Ontario that are required to report to the NPRI must submit their NPRI report to their regional NPRI office. The report to the Ontario Ministry of the Environment is created separately, and is called EXPO_MOE.MDB.

Retain a Copy of the Information on which your NPRI Report was Based

This is a legal requirement, pursuant to subsection 46(8) of the CEPA 1999, and the *Canada Gazette* notice. The owner or operator of a facility is required to keep copies of the required information, together with any calculations, measurements and other data on which the information was based. This information must be kept at the facility to which it relates or at the facility's parent company (as identified in section A3.0) for a period of three years.

Request for Confidentiality

Reporting to the NPRI for 2002 is governed by the requirements of the CEPA 1999, as well as the *Canada Gazette* notice, published December 29, 2001, and its amendment published December 28, 2002.

Pursuant to sections 51 and 313 of the CEPA 1999, any person who provides information in response to the 2002 *Canada Gazette* notice may submit a written request that it be treated as confidential, based on the reasons set out in section 52 of the CEPA 1999. For each facility and each substance reported, the request for confidentiality must clearly indicate each field for which a request is being made. **The written request must accompany the report.**

To be treated as confidential, the company must demonstrate that it treats the information as confidential and wishes to continue to do so. It must also demonstrate that this information is not available to the general public through legal means, such as obtaining a public copy of a provincial waste permit.

A request for confidentiality is not determinative. A determination of whether the information is confidential will be based on an objective analysis of the facts.

It is recommended that you include with your request for confidential treatment, documentation that would be required to justify that the information submitted should be confidential as per the criteria outlined in section 52 of the CEPA 1999.

If substantiation is not provided with the claim, or the substantiation provided doesn't support the claim, the Minister may follow the procedures with respect to publication of the information set out in section 53 of the CEPA 1999. Notwithstanding the above, the Minister may, in the appropriate circumstances, contact the person to inform them that the information may be disclosed as permitted under sections 315 through 317 of the CEPA 1999.

A request for confidentiality will be denied if the data are already in the public domain.

Necessary precautions should be taken when submitting an NPRI report for which a request for confidentiality is being made. This includes, but is not limited to, the following:

- confidential materials are to be sent in double envelopes, excluding the courier outer envelope
- the outside envelope should be unmarked except for mailing and return addresses, and postage, and
- the inside envelope should be stamped on both sides with wording such as "Contains Confidential Information".

Should you have any questions concerning confidentiality requests, contact your regional NPRI office listed on the inside front cover of this Guide.

Section 52 of the CEPA 1999

With regards to information submitted to the NPRI, section 51 of the CEPA 1999, allows any person to submit with the information, a written request, setting out the reason(s) referred to in section 52 (see below), that the information be treated as confidential.

Section 52 of the CEPA 1999, provides that:

52. Despite Part 11, a request under section 51 may only be based on any of the following reasons:

(a) the information constitutes a trade secret;

(b) the disclosure of the information would likely cause material financial loss to, or prejudice to the competitive position of, the person providing the information or on whose behalf it is provided; and

(c) the disclosure of the information would likely interfere with contractual or other negotiations being conducted by the person providing the information or on whose behalf it is provided.

You now have completed your NPRI report for 2002.

Ensure that you submit your report and signed Statement of Certification, postmarked, courier-dated or e-mailed, **no later than June 1, 2003**. Retain a copy of the report and information on which it was based at your facility or parent company.

You will be able to upload the data from your 2002 report next year if you are required to report to the 2003 NPRI.

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Questions and Answers

1. Is a facility meeting the criteria described in the *Canada Gazette* notice required to report if there were no releases of NPRI substances during the calendar year?

Yes. The reporting requirements vary by substance. The criteria for most substances are based only on quantity manufactured, processed or otherwise used, number of employees and concentration of NPRI substances. The reporting criteria for Part 1B substances, PAHs, dioxins/furans, hexachlorobenzene and CACs differ from those previously mentioned, and may be activity or release-based. Details are provided in this Guide and the *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory.* Once you meet the substance-specific reporting criteria, you must report regardless of the amounts released or transferred.

2. Our facility closed part way through the calendar year. Are we required to submit an NPRI report?

Yes. If your facility met the reporting criteria and was in operation during any portion of the calendar year, you are required to report.

3. In British Columbia, several fish processors have factories on ships. They use ammonia and chlorine in their fish processing operations. Is each ship considered a "facility" under the *Canada Gazette* notice or is the whole group of ships (assume one company) a facility?

Under the NPRI, a facility can be either a contiguous facility, defined as as all buildings, equipment, structures, and other stationary items which are located at a single site, or adjacent or contiguous sites owned or operated by the same person or a pipeline installation. A ship is not a facility as defined under the notice. It is not stationary and it is not located on a single site. Therefore, there is no requirement to report.

4. A barge-repair facility cleans barges by vacuuming out residual products containing listed substances and recycling them. Must the facility report?

The facility is processing the chemicals. If the threshold criteria for reporting are met, the facility must submit a report. Releases during vacuuming must be reported as well as releases from related activities such as spills and equipment cleaning.

Routine cleaning of the exterior of the barge is considered maintenance of a transportation vehicle and is therefore exempt.

5. Does the determination of a full-time employee "equivalent" include the hours worked by sales staff whose offices are located in the same building as the production staff, or who work outside the facility?

Yes. All staff employed at a facility, regardless of function or location, count toward the employee threshold determination.

This includes persons employed at the facility, owners who performed work on site at the facility, and persons such as contractors who performed on-site work related to the normal operation of the facility on a routine basis.

6. Would a facility with nine full-time employees and four part-time employees be required to report to the NPRI?

Total the hours worked by all people, including contractors who are performing work related to the operations of the facility. If the total is 20 000 hours or more per year, the criterion for the number of full-time employees has been met. However, the employee threshold does not apply to facilities used for incineration, wood preservation, terminal operations, and wastewater collection as listed in the *Canada Gazette* notice. These facilities are required to report if they meet the remaining reporting criteria. In addition, regardless of the number of employee hours worked, a facility operating a stationary combustion unit that doesn't qualify as an exempt combustion unit must report CAC releases that meet any of the CAC mass thresholds. To qualify as an exempt combustion unit, the stationary combustion unit must meet all the following criteria:

- the only releases to air occurred from stationary external combustion equipment, and
- it had a cumulative nameplate capacity of less than 10 million BTU/hour for all sources, and
- it used only commercial grade natural gas, liquefied petroleum gas, or No.1 or 2 fuel oil, or any combination thereof.

7. When calculating the total number of hours worked by all employees during the calendar year, should overtime, vacation and sick leave be included in the 20 000-hour threshold?

Yes. The facility must consider all overtime, paid vacation and sick leave in the 20 000-hour threshold.
An employee includes a person employed at the facility, an owner who performed work on site at the facility, and a person who performed work on site at the facility on a routine basis that is related to the normal operations of the facility, for the period of time the person performed that work, such as contractors.

8. When should an individual's time spent working at a facility be counted for purposes of determining whether or not a facility meets or exceeds the 20 000-hour threshold?

If an individual is employed by the facility or by the facility's parent company to work at the facility, then all of the hours worked by the individual must be counted toward the 20 000-hour threshold. Contractors performing work related to the operations of the facility must also be included. If an individual both owns and works for the facility, their hours must be applied to the 20 000-hour threshold.

9. Who is required to submit the NPRI report for a given calendar year if the facility has changed ownership during that year?

The owner or operator of the facility as of December 31 of the calendar year is responsible for submitting the report for that year if the facility met the criteria for reporting. Transfers of ownership must ensure that information for NPRI reporting for the entire calendar year is available.

10. Is the owner or the operator responsible for reporting?

The notice requires a person who owns or operates a facility to report information to which the person has access or can reasonably be expected to have access. This is usually the operator. However, both the owner and the operator are subject to the notice. If no report is received from a facility that met the reporting requirements, both persons may be held liable.

11. Which is the parent company for a 50/50 joint venture?

The reporting form allows a number of parent companies to be entered with the percentage of ownership for each.

12. A facility had been operating its manufacturing processes in a leased warehouse. In July, they bought their own warehouse and moved the manufacturing operations. These two locations are neither adjacent nor contiguous. The company did not shut down or close during this time. How should the facility make threshold determinations and report to the NPRI?

The company must consider the locations as two separate facilities because the operations were carried out at two distinctly separate physical sites. Threshold determinations must be made for the period of time during which each facility operated. A new NPRI ID number will be assigned to the new facility.

13. Acme Plastics is a wholly owned subsidiary of a major chemical company which is a wholly-owned subsidiary of XYZ Oil Corp. Which is the parent company?

XYZ Corporation is the parent company because it is the highest-level company that directly controls Acme Plastics.

14. Two manufacturing facilities, owned by the same company, are divided by a public railway. Are they considered adjacent facilities or two separate facilities?

Two facilities owned or operated by the same company that function as a single integrated site, but are separated by a railway, would be considered adjacent sites since they are physically adjacent to one another except for a public right-of-way. Therefore, reporting thresholds would be determined by the combined quantities of substances manufactured, processed or otherwise used at both facilities. The 20 000-hour threshold would be determined by the sum of hours worked at both facilities.

15. A Vancouver-based company has a plant in Alberta which processes 12 tonnes of methanol, a plant in Ontario which processes 8 tonnes of methanol and a plant in Quebec which processes 11 tonnes of methanol. Do the three plants have to report as a company or can they report as separate facilities?

A report is required for each facility that met the reporting criteria; their activities cannot be combined. In this case, the plant in Ontario is not required to report but the other two are since they met the 10-tonne threshold for methanol. The company may choose to report for each of the facilities meeting the reporting criteria on one disk, or to have each facility submit its report separately.

16. When contractors working at a facility supply their own materials and supplies, such as solvents containing NPRI substances, should these substances be included in the threshold determination and reported by the facility?

Yes. The owner or operator of the facility must include in their threshold calculations the quantities of NPRI substances used by contractors if those uses are relevant to the purpose of the facility.

17. An NPRI substance is the working fluid in our heat transfer equipment. Must the quantity of the NPRI substance be accounted for in determining the reporting threshold?

Yes. The fluid within the heat-transfer equipment is considered to be an "other use" of the NPRI substance, relevant to the purposes of the facility as defined in the *Canada Gazette* notice. All of the NPRI substance in the heat-transfer equipment must be included in the threshold calculation.

18. Our company disposes of some of its waste in a landfill site which belongs to the company, but is in a different location. Is this an off-site transfer or a release?

It is a transfer if the landfill is not adjacent or contiguous with the facility. Otherwise, it is a release.

19. Our company sorts scrap metal and compresses it into bales to be sold to secondary metal producers. Most of the metal we recover contains some NPRI substances (Zn, Cr excluding hexavalent chromium) in excess of 1% concentration. The process does not release any NPRI substances; it only compresses the pieces into bales. Are we required to submit a report?

No. In this case, the items being handled would retain their status as articles as long as there are no on-site releases to the environment or off-site transfers for disposal.

20. At what point in the processing of ore must mining companies report?

The exemption for mining is for activities related to the actual removal of ore, rock or overburden, up to and including primary crushing. The mining exemption, however, does not apply to Part 4 substances (CACs), if the mining operation ran a stationary combustion unit that did not meet the criteria of an exempt unit (see Question 6 for explanation of exempt combustion unit). In this case, the mining operation must report any CAC releases from its combustion equipment that met the CAC mass thresholds.

Any NPRI substances used and/or released in the further processing of the rock or ore, such as milling, concentrating, smelting and refining would be reportable if the thresholds were met.

This would include, but not be limited to, NPRI substances found in the processed ore, solvents, acids, flotation agents, flocculation agents, dust suppressants, and fuels used in power generation. Listed substances in tailings are not reported unless they left the tailings impoundment or other forms of on-site containment.

21. If a substance is spilled one year, and will result in air emissions over time in the following year, how should it be reported?

The portion of the spill not cleaned up must be reported as a release the year it occurred. It must be reported as a release to the environmental media affected (air, water, land). Further migration between media does not need to be reported.

22. Can a facility use its own software to report electronically to the NPRI?

Environment Canada supplies the software required for reporting and strongly recommends that this be used to submit an NPRI report.

If you choose to use other software and the report submitted cannot be read and verified by Environment Canada's own reporting software, the report will be considered incomplete and will be returned for correction. Environment Canada reserves the right to change its software and file structure at any time.

23. We use a 50% methanol solution in one part of the plant. The annual consumption of methanol exceeds 10 tonnes. In another part of the plant, a completely separate process produces a few tonnes of methanol which are released through a stack. Do we have to estimate methanol releases from the stack even if they are from a different process?

Yes. Because your facility uses more than 10 tonnes of methanol, it is required to report all its releases of methanol, regardless of the process stream.

24. We have a provincial waste permit to discharge sulphuric acid at a pH between 5.8 and 6.6. How do we report our releases of sulphuric acid if we met all the reporting requirements?

Releases of mineral acids at a pH of 6.0 or greater are considered neutralized and must be reported as zero (0). The portion of acid discharged at a pH of less than 6.0 will constitute a reportable release and must be calculated and reported.

25. We send an NPRI substance to an outside company for recovery. The recovered substance is then sent back to us for reuse. Does the recovered substance count toward the threshold calculation?

Yes. If the recovered substance is being processed or used it would have to be included in the threshold calculation since it is the same as new material being processed or used.

26. A company engaged in electroplating is using equipment and lead anodes purchased and installed before the current reporting year. Sixty kilograms of lead anodes were originally installed in the plating tanks. The lead anodes dissolve over time and the lead ends up in sludge and wastewater. During the calendar year, the company replaced 20 kilograms of lead anodes. Does the company have to submit an NPRI report for lead?

Yes. The entire electrode assembly is considered to be an "other use" of lead, relevant to the purposes of the facility as defined in the *Canada Gazette* notice. The entire quantity of lead in the electrode assembly, 60 kilograms, must be used in the threshold calculation, not just the 20 kilograms consumed in the process.

27. When do metal parts, sheets or wire containing NPRI Part 1A and 1B substances lose their status as articles?

Metal parts, sheets or wire lose their article status when there are releases to the environment or transfers for disposal.

If all materials removed during processing, such as turnings or blanks, are completely recycled and due care has been exercised to ensure that the materials are 100% recycled within the facility, the materials retain their article status.

Due care is considered to have been exercised if no more than 1 kg (0.001 tonne) of an NPRI Part 1A substance is released in a given year as a result of the processing or other use of an article.

Due care does not apply to Part 1B substances because of their low reporting thresholds.

Typical metal-processing activities that revoke article status include welding, torch cutting, quenching, etching and dry grinding.

Typical metal-processing activities that do not revoke article status (assuming "due care" is exercised in ensuring 100% recycling of materials) include cutting, stamping, bending, punching, machining, shearing, soldering and cold extrusion.

28. Our company purchases metal parts and then welds them together using welding rods. We then paint them and glue other parts to them. What would be reportable in this case?

The original parts would lose their status as articles during welding because the welding process releases emissions to the air. The quantity of NPRI substances contained in the parts would be used to calculate the reporting threshold. The quantity of NPRI substances in the welding rods would also be included in the calculation of the reporting threshold.

NPRI substances contained in the paints and glues would be reportable if the threshold criteria were met.

29. Is the use of fuel exempt from reporting?

No. The use of fuel is not implicitly exempt from reporting. Use of fuel in a stationary system, such as for power generation, would be reportable if the threshold criteria are met.

Retail sale, storage and fuel distribution are exempt except as part of terminal operations. Refuelling of motor vehicles is also covered by this exemption even if the vehicle is refuelled from a tank on company property. Mobile sources such as vehicles and earth-moving equipment are not stationary items considered part of a facility. They are not to be included in the calculation of the reporting threshold.

30. Chromated copper arsenate (CCA) is used in the wood-treatment industry but is not on the NPRI substance list. Do we have to report?

While CCA is not an NPRI substance, copper, chromium, arsenic and their compounds are on the list. A threshold calculation must be performed for each individual substance. Furthermore, since the chromium in CCA is hexavalent, the 50-kg threshold applies for both chromium and arsenic.

A typical bulk solution of CCA (50% concentrate) contains 12.3% Cr, 7.39% Cu, and 11.09% As, by weight. A company would therefore have to use 407 kg, 135 tonnes and 451 kg, respectively, of 50% concentrate of CCA to render Cr, Cu and As reportable.

31. Should fugitive dust from tailings dams and tailings impoundments be reported to the NPRI as releases?

Yes. NPRI substances that are released as fugitive emissions must be reported. For mines, this might include the individual metals in the dust, as well as the dust itself as a reportable particulate. The deposit of NPRI substances contained in the mineral portion of the ore or rock to a tailings pond is not reportable, but releases from the pond or dam are.

32. Our mine operates a wastewater-treatment system for tailings impoundment effluent. The treatment process generates a metal hydroxide sludge containing two NPRI substances. The sludge is pumped back into the tailings impoundment. Are the NPRI substances in the sludge considered releases?

Substances that are pumped back into a tailings impoundment are not considered releases. The amount of substances leaving the tailings impoundment would be reported as a release.

33. Should hydraulic backfill pumped underground and used for filling open stopes for ground control be reported?

No. Stope filling for ground control is part of the extraction process and is therefore included in the mining exemption.

34. We use zinc in our primary crusher as backing for concaves and shells. Is it reportable?

No. The mining exemption is for extraction up to and including primary crushing.

35. Do NPRI substances contained in a refractory brick furnace have to be reported?

No. Refractory bricks would retain their status as articles as long as they do not release any NPRI substances during normal use. However, the refractory bricks lose their article status if during normal conditions of use they degrade and release NPRI substances. In that event, the total quantity of NPRI substances in the refractory lining must be used in the calculation of the reporting thresholds for each substance.

36. Our ore-processing facility uses greases and fuels in many machines used in the benefaction of the ore. Are NPRI substances in these greases and fuels reportable?

Yes. Process equipment maintenance using materials such as grease, oils or lubricants, disinfectants or paint etc., is not exempt and must be considered for the purposes of NPRI reporting. The use of greases and fuels in this situation would be considered as "other use".

37. We use more than 10 tonnes of sodium cyanide in our flotation beds. The substance is entirely consumed and transformed to non-ionic cyanides in the process. We met all other reporting criteria. Are we required to report?

Yes. Reporting of NPRI Part 1A substances is based on quantity manufactured, processed or otherwise used, not on quantities released. You must perform your threshold calculations based on the amount of cyanide ion used or processed and submit a report if you met or exceeded the 10-tonne threshold. Since non-ionic forms of cyanide are not on the NPRI substance list, you would report a zero release of cyanide ion.

38. We use copper sulphate as a reagent. During the process, it attaches itself to other compounds and remains with the concentrate. There are no releases. Is it reportable?

Yes. If the amount of copper met or exceeded the 10-tonne reporting threshold, you would submit a report for "copper (and its compounds)" and report a release of zero for this process. All other releases of copper from your facility would also have to be reported.

39. We use zinc sulphate, zinc oxide and zinc stearate. How do we handle reporting of all these different metal compounds?

Report only the zinc portion of the compounds under the substance name "zinc (and its compounds)".

40. Is fuel used for fire-training purposes reportable to the NPRI?

A facility used for the education or training of students is exempt from reporting Part 1A, 1B, 2 and 3 substances. The use of fuels does not need to be reported. However, if the training facility operates a stationary combustion unit that does not qualify as an exempt unit (see Question 6 for explanation), then it must report CAC releases from the combustion unit that met any of the CAC mass thresholds.

41. We store products in our warehouse that don't belong to us. We do not use these products in the operation of our warehouse. Some of these products contain NPRI substances. Are we required to report?

No. A warehouse is not required to report if it does not manufacture, process or otherwise use NPRI substances. Transfer of NPRI substances between containers is considered processing. Wholesale distribution is exempt, provided there are no releases of NPRI substances.

42. We buy bulk NPRI substances in tanks and drums. Some of these substances are simply repackaged in smaller containers, e.g., tanks to drums, drums to 4-litre plastic bottles. However, some of the substances are mixed together and then repackaged. Are we required to report?

Transfer of substances between containers is considered processing and those quantities must be included in the threshold calculation. Mixing of substances together prior to packaging is considered processing.

43. We use an NPRI substance in our process that met all reporting criteria. Unfortunately, we have no data on possible releases and we cannot find any estimation factors. Is a release of zero acceptable in this case?

For Part 1A, 1B and 2 substances, you are required to report the information that you possess. You must report your facility information and identify the substances for which a report is required. You would report "zero" releases only if it is known that these substances were not released or transferred.

If you met the reporting criteria for dioxins/furans and HCB (Part 3 substances), but have no data and cannot find emission factors, you are required to report "No information available" ("Basis of Estimate" code "NI") for any releases and transfers expected to contain these substances (e.g., releases to air from a combustion process that generates dioxins/furans).

44. We purchased 12 tonnes of an NPRI substance to prepare a solution for our new metal-cleaning baths. The baths will be used this year. How do we calculate the "otherwise use" threshold for this year and future years?

The metal-cleaning bath is considered to be an "other use" of an NPRI substance, relevant to the purposes of the facility as defined in the *Canada Gazette* notice. The entire quantity of the NPRI substance in the metal cleaning bath and any quantity used to refill the bath must be used in the threshold calculation not just the quantity consumed in the process.

45. Are vinyl chloride and polyvinyl chloride (PVC) the same compound?

No. Polyvinyl chloride is a polymer made from vinyl chloride. It is not the same substance and is not listed in the NPRI; therefore, it is not reportable. Only free vinyl chloride monomer is reportable. Some formulations of pre-polymers may contain a percentage of free monomer. If you purchase pre-polymers which contain free vinyl chloride monomer, add this to the threshold calculation.

46. Asbestos is listed with the CAS number 1332-21-4. We use asbestos with the following names and CAS numbers: Azbolen (17068-78-9), Actinolite (77536-66-4), Amosite (12172-73-5), Anthropylite (77536-67-5), Tremolite (77536-68-6) and Serpentine. Are we required to report?

The CAS number 1332-21-4 is defined as "Asbestos, a greyish, non-combustible fibrous material. It consists primarily of impure magnesium silicate". Asbestos with the CAS number 1332-21-4 is the general CAS number for a number of specific types of asbestos including those mentioned. Those types of asbestos would be reportable if they are in friable form.

47. A facility coats materials using a vacuum deposition process. When it uses aluminum for coating, is it required to report for aluminum fumes?

In vacuum deposition, the metal is converted to a vapour state under low pressure. The vapour condenses on the material to be coated. Vapours are not fumes. A metal fume consists of finely divided particulate matter dispersed in a gas (like smoke). Because vapours and fumes are different, this process would not be considered a reportable activity unless the condensation creates fumes or dust.

48. What types of routine maintenance are exempt?

Routine janitorial or other facility grounds maintenance activities that may use NPRI substances which would be contained in cleaners, fertilizers or pesticides are exempt.

Process equipment maintenance using materials such as grease, oils or lubricants, disinfectants or paint etc., is not exempt and must be considered for the purposes of NPRI reporting.

49. Our process uses metal grinding wheels which suffer regular abrasion. Would NPRI substances in these wheels be reportable?

Yes. Items such as grinding wheels are, by their nature and use, intended to wear down and release substances. They are designed to be replaced and are subject to reporting.

50. Are degreasers used in a plant's maintenance shop reportable?

Yes. Degreasing of equipment for maintenance is not considered routine maintenance and is not exempt. It would be reported as "otherwise used".

51. Is our quality-control laboratory exempt from reporting under the research and testing exemption?

Yes. The laboratory is exempt from reporting Part 1A, 1B, 2 and 3 substances if it does not perform pilot-scale studies or specialty chemical production. However, if the quality-control lab operates a stationary combustion unit that doesn't qualify as an exempt unit (see Question 6 for explanation), then it must report CAC releases from the combustion unit that exceeded the CAC mass thresholds.

52. Are photo development laboratories exempt?

No. The laboratory exemption includes research facilities that perform auxiliary functions to the manufacturing or processing activities of a facility. Photo development laboratories do not perform auxiliary functions, but rather perform activities essential to the development of their products (photographs, films, etc.).

53. We buy more than 10 tonnes of chlorine gas and use it in a reaction vessel to produce more than 10 tonnes of chlorine dioxide. We then dilute the chlorine dioxide to less than 1% concentration. What do we have to report?

Because you met the 10-tonne threshold for chlorine gas, you are required to report any releases and transfers of chlorine gas. Because you manufacture chlorine dioxide at a concentration greater than 1%, you are required to report any releases and transfers of chlorine dioxide. The subsequent dilution of the chlorine dioxide does not affect the threshold calculation.

54. How do we address NPRI substances contained in industrial and commercial batteries?

Items such as batteries, which contain NPRI substances that are not released during normal use, are considered articles and are not subject to reporting. However, the item loses its article status if NPRI substances were released. Also, if you recycle lead-acid batteries by crushing and removing the lead, then the batteries cease to be articles and the NPRI substances they contain must be considered in the threshold calculation.

55. How do we treat a solvent sent off site for distillation and then shipped back to us?

A solvent received from a recycling operation located off-site counts as new material and must be included in the threshold calculation. The quantity sent off site for distillation must be reported as material sent for recycling.

56. We use a paint thinner that contains toluene. We also use toluene in another part of our plant. In total, more than 10 tonnes of toluene are used annually. The waste thinner is sent to an off-site facility for blending in fuels. How do we report this activity?

NPRI substances sent off site for fuel blending or that add energy to a heat-recovery activity must be reported as a transfer for energy recovery. Other releases or transfers of toluene must also be reported.

57. Are NPRI substances used in maintenance activities such as paint-booth cleaning, reportable?

Paint-booth cleaning is not considered a routine janitorial activity and would be reportable under the classification "other use".

58. How does the NPRI definition of a facility apply to a multi-plant site?

"Facility" is defined in the *Canada Gazette* notice as a contiguous facility and pipeline installation. A contiguous facility includes all buildings or structures located on a single site or on adjacent sites which are owned or operated by the same person and function as a single integrated site.

Plants must report separately if they manufacture or process unrelated products and if they do not share common manufacturing or processing operations. For example, a battery plant and a vehicle-assembly plant, located side-by-side, are two distinct manufacturing operations that have different SIC codes. In the case of the battery plant, it also ships products to other installations. Other examples are smelters and fertilizer plants, a refinery and a chemical plant.

59. Is reporting to the NPRI mandatory under the *Canadian Environmental Protection Act, 1999* (CEPA 1999)? If so, how will it be enforced?

It is the responsibility of each person who owns or operates a facility to determine whether they are required to report after examining the *Canada Gazette* notice and the CEPA 1999. There is an enforcement and compliance policy under the CEPA 1999, which dictates how regulations and notices are enforced.

60. A pulp mill is connected to its waste-treatment facility by a 10-km pipeline. The pipe travels on land not owned by the company. The waste treatment facility employs only two full-time staff. How should they report?

A waste-treatment facility owned or operated by the company or parent company and connected to the pulp mill by any combination of a permanent continuous pipe, conveyor, tunnel or sluiceway, and which functions as part of a single integrated facility shall be considered part of the pulp mill for the purposes of reporting to the NPRI.

In this case, the treatment plant is an integral part of the pulp mill and is connected to it by a permanent, continuous connection. Both plants are operated by the same company as a single integrated facility. This represents a contiguous facility, and the company's report to the NPRI must include activities at the waste-treatment facility.

61. A facility that previously reported to the NPRI has been split up and now is owned and operated by two separate companies. How should they report to the NPRI?

If the companies are owned by the same parent company AND function as a single integrated facility, they must report as one facility. If they do not meet both of the above conditions, they must perform separate threshold calculations and report separately.

62. Are substances regulated under other legislation (e.g., *Pest Control Products Act*) exempt from reporting to the NPRI?

There is no exemption for substances regulated under other legislation.

63. Is a solid waste landfill required to report to the NPRI?

The definition of "other use" includes disposal. Solid waste landfills provide final disposal for NPRI substances. If the facility meets other threshold criteria, they are required to report. Additionally, landfills can generate, as a consequence of disposal, by-products such as ammonia in their leachate.

64. We use chlorine as an aqueous disinfectant in our facility. Will we have to report chlorine releases?

Assuming you met the 10-tonne threshold for chlorine, you must submit a report. Chlorine, when added to water, will no longer exist as a reportable substance in most circumstances, resulting in a report of zero release. However, if the pH of the treated water falls below 6.5, you must consider the equilibrium of chlorine and HCl when performing the threshold calculation for each substance.

65. What activities at a chemical distribution facility would potentially trigger NPRI reporting?

Unloading, transferring, blending and repackaging are forms of processing which can trigger NPRI reporting. The filling and emptying of storage tanks is also considered processing, and fugitive releases from those tanks must be included when calculating CAC mass thresholds . All releases and transfers off site for disposal or recycling resulting from these activities are reportable. Substances that arrived in sealed containers and were only stored in a warehouse prior to distribution would not be included. Also, if the chemical distribution facility operates a stationary combustion unit that doesn't qualify as an exempt unit (see Question 6 for explanation), it must report CAC releases from the combustion unit that exceeded CAC mass thresholds.

66. Our mine used 200 tonnes of steel grinding balls which contain 15-18% of chromium (excluding hexavalent chromium). These grinding balls are totally consumed during processing after primary crushing. Do we need to report for chromium?

Approximately 30-36 tonnes of chromium (excluding hexavalent chromium) were used in processing the ore. The threshold criteria for reporting for chromium (and its compounds) has been met and you are required to report.

67. After primary crushing of ore at a mine, ethylene glycol was applied to the crushed ore as a dust suppressant or to prevent the ore from freezing. Does this use of an NPRI substance fall under the exemption for mining in the *Canada Gazette* notice?

No. Addition of ethylene glycol was done intentionally to aid in the further processing of ore or distribution of the ore in commerce. This is not related to the primary extraction of the mined materials and is a processing step that does not fall under the basic mining exemption and therefore must be reported to the NPRI.

68. My facility has heating, ventilation and air conditioning (HVAC) systems and refrigerant equipment that contain halocarbons listed on the NPRI substance list. Does this use have to be considered?

Yes. Reporting to the NPRI would be required if the HVAC systems and refrigerant equipment within a facility had a total holding capacity of 10 tonnes or greater (Note: this does not refer to the cooling capacity of the system which may also be expressed in tonnes. The equipment nameplate should also indicate the halocarbon capacity of each unit). The 10-tonne threshold calculation should be completed for each halocarbon within the facility (i.e., if the chillers contain CFC-11 but the condensers and evaporators contain HCFC-22 they are not to be included in the same calculation). Also, calculations should include the quantity of halocarbon that was in the system at the beginning of the year plus any additional halocarbons that were added (i.e., during annual leak test) throughout the calendar year. Halocarbons used in office and plant air.conditioning systems must be included in the 10-tonne threshold calculation. Halocarbons used by employees for personal use (i.e., refrigerators in lunch rooms/cafeteria, water fountains, vending machines) are not to be included.

69. Our facility has a halon fire-suppression system. Do we need to report for halon?

Halon in a fire-suppression system is considered to be an "other use" of an NPRI substance. If the fire-suppression system contains Halon 1211 or Halon 1301 in quantities equal to or greater than 10 tonnes and meets other NPRI reporting criteria, the facility would be required to report to the NPRI. Also, calculations should include the quantity of halon that was used in the system at the beginning of the year, plus any additional halon added (i.e., after use or during maintenance). The type and quantity of halon will be listed on the equipment nameplate. Halons in storage are not in use and do not need to be included in a threshold calculation, although any leaks from storage must be considered.

70. As part of its process equipment, a facility has installed a catalyst containing one or more NPRI-listed substances. The catalyst has a fixed shape (pellets). Does the article exemption apply to catalysts and to the NPRI substances they contain?

No. An article is "a manufactured item that does not release a substance, under normal conditions of processing or other use". Even though the pellets themselves appear to meet the definition of an article, there will be releases (dust emissions, spills, etc.) as a result of normal handling in installation or charging, removal for disposal, regeneration or recycling, and operational use of the catalyst. Therefore, the article exemption does not apply in this case. All NPRI substances present in the catalyst must be included in the threshold calculation for each substance.

Also, the article exemption does not apply to Part 1B substances in any case. This is because there is no quantitative measure of due care in recycling Part 1B substances. Even minimal releases of Part 1B substances can cause significant adverse effects to human health and the environment and can reasonably be expected to contribute to exceeding their low thresholds.

71. This year, we removed asbestos, used as insulation, from our facility. Are we required to submit a report for asbestos?

If asbestos (friable form) is removed from any part of the facility, it must be included in determining whether the facility met the 10-tonne manufacture, process or otherwise use threshold for this substance. Once the facility meets the 10-tonne threshold, a report must be submitted for asbestos, and the quantity removed from any part of the facility must be reported.

References and Bibliography

ASTM (2002). Standard Practice for Determination of a Pooled Limit of Quantification, D6259-98.

Canadian Council of Ministers of the Environment (2001). *Canada-wide Standards for Dioxins and Furans.*

Canada Gazette (December, 2001) "Notice with Respect to Substances in the National Pollutant Release Inventory for 2002", Department of the Environment, Extract *Canada Gazette*, Part I (December 29, 2001).

Canada Gazette (December 2002) "Notice with Respect to Substances in the National Pollutant Release Inventory for 2001 – Amendment", Department of the Environment, Extract *Canada Gazette*, Part I (December 28, 2002).

Canada Gazette (1992) "Export and Import of Hazardous Wastes Regulations", Department of the Environment, Extract *Canada Gazette*, Part II (December 2, 1992).

Canada Gazette (1991) "Domestic Substances List", Department of the Environment, Extract, Supplement *Canada Gazette*, Part I (January 26, 1991).

Canadian Environmental Protection Act, 1999. <http://laws.justice.gc.ca/en/C-15.31/text.html>

Canadian Environmental Protection Act, 1999. Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations, (SOR/92-267). <http://laws.justice.gc.ca/en/C-15.31/SOR-92-267/text.html>

Environment Canada (2003) "Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory – 2002".

Environment Canada (2003) "National Pollutant Release Inventory Guidance Manual for the Wastewater Sector".

Environment Canada (2003) "Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory", in collaboration with the Canadian Institute of Treated Wood.

Environment Canada (1993) "User's Guide to Hazardous Waste Classification".

Environment Canada (2000) "Determination of Level of Quantification for Measuring HCB and PCDD/PCDF in Soil", Analysis and Air Quality Division, Environmental Technology Centre, Draft (February, 2000).

Environment Canada (1997) "Determination of LoQs for Measuring Hexachlorobenzene in Selected Solvents", Draft Report AAQD 97-01, Analysis and Air Quality Division, Environmental Technology Centre (revised September, 1997).

Environment Canada (1999) "Level of Quantification Determination: PCDD/PCDF and Hexachlorobenzene", Analysis and Air Quality Division, Environmental Technology Centre (November, 1999).

Government of Ontario (2001). *Environmental Protection Act* - O. Reg.127/01. <http:/192.75.156.68:81/ISYSquery/IRLF9E.tmp/2/doc>

Health of Animals Act (1990). <http://laws.justice.gc.ca/en/publaw/46076_11919.html>

NATO/CCMS (North Atlantic Treaty Organization/Committee on the Challenges of Modern Society) (1998) "Pilot Study on Internal Information Exchange on Dioxins and Related Compounds", International Toxicity Equivalency Factor (I-TEF), Method of Risk Assessment for Complex Mixtures of Dioxins and Related Compounds, Report No. 176. 26 pp.

Statistics Canada (1998) "North American Industry Classification System (NAICS) Canada Manual – 1997", Catalogue 12-501-XPE, Ottawa, ON.

Statistics Canada (1989) "Standard Industrial Classification – 1980", Standards Division, Catalogue 12-501E, Ottawa, ON.

van den Berg M., L. Birnbaum, B.T.C. Boseveld, B. Brunström, P. Cook, M. Feeley, J.P. Giessy, A. Hanberg, R. Hasegawa, S.W. Kennedy, T. Kubiak, J.C. Larsen, F.X. Rolaf van Leeuwen, A.K.D. Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M. Tysklind, M. Younes, F. Waern, T. Zackarewski (1998) "Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife", Environ. Health Perspect. 106:775-792 (December, 1998).

U.S. EPA Web site "Technology Transfer Network Clearinghouse for Inventories and Emission Factors", Office of Air Quality Planning and Standards, Emission Factor and Inventory Group. <www.epa.gov/ttn/chief/>

Publications of the U.S. Environmental Protection Agency

Guidance Documents for Reporting to the Toxics Release Inventory

In 1988 and 1990, the Office of Pollution Prevention and Toxics of the U.S. Environmental Protection Agency (U.S. EPA) developed many industry-specific guidance manuals to help industries estimate the releases for reporting to the Toxics Release Inventory (TRI). Since 1998, some of these manuals have been revised and some additional industry-specific guidance manuals have been prepared. These manuals, listed below, could also be used for reporting to the NPRI.

1. *Estimating Chemical Releases from Monofilament Fiber Manufacturing,* EPA 560/4-88-004a (January, 1988).
2. *Estimating Chemical Releases from Printing Operations,* EPA 560/4-88-004b (January, 1988).
3. *Estimating Chemical Releases from Electrodeposition of Organic Coatings,* EPA 560/4-88-004c (January, 1988).
4. *Estimating Chemical Releases from Spray Application of Organic Coatings,* EPA 560/4-88-004d (January, 1988).
5. *Estimating Chemical Releases from Semi-Conductor Manufacturing,* EPA 560/4-88-004e (January, 1988).
6. *Estimating Chemical Releases from Formulation of Aqueous Solutions,* EPA 560/4-88-004f (March, 1988).
7. *Estimating Chemical Releases from Electroplating Operations,* EPA 560/4-88-004g (January, 1988).
8. *Estimating Chemical Releases from Textile Dyeing,* EPA 560/4-88-004h (February, 1988).
9. *Estimating Chemical Releases from Presswood and Laminated Wood Products Manufacturing,* EPA 560/4-88-004i (March, 1988).
10. *Estimating Chemical Releases from Roller, Knife, and Gravure Coating Operations,* EPA 560/4-88-004j (February, 1988).
11. *Estimating Chemical Releases from Paper and Paperboard Production,* EPA 560/4-88-004k (February, 1988).
12. *Estimating Chemical Releases from Leather Tanning and Finishing,* EPA 560/4-88-0041 (February, 1988).
13. *Estimating Chemical Releases from Wood Preserving Operations,* EPA 560/4-88-004p (February, 1988).
14. *Estimating Chemical Releases from Rubber Production and Compounding Operations,* EPA 560/4-88-004q (March, 1988).
15. *Issue Paper – Clarification and Guidance for the Metal Fabrication Industry,* (January, 1990).
16. *Guidance for Food Processors,* EPA 560/4-90-014 (June, 1990).

17. *EPCRA Section 313 Reporting Guidance For Food Processors (Update)*, EPA 745-R-98-011 (September, 1998).

18. *EPCRA Section 313 Reporting Guidance for Spray Application and Electrodeposition of Organic Coatings*, EPA 745-R-98-014 (December, 1998).

19. *Industry Guidance for Coal Mining Facilities*, EPA 745-B-99-002 (January, 1999).

20. *Industry Guidance for Electricity Generating Facilities*, EPA 745-B-99-003 (January, 1999).

21. *Industry Guidance for Metal Mining Facilities*, EPA 745-B-99-001 (January, 1999).

22. *Industry Guidance for Chemical Distribution Facilities*, EPA 745-B-99-005 (January, 1999).

23. *Industry Guidance for RCRA Subtitle C TSD Facilities and Solvent Recovery Facilities*, EPA 745-B-99-004 (January, 1999).

24. *Industry Guidance for Petroleum Terminals and Bulk Storage Facilities*, EPA 745-B-99-006 (January, 1999).

25. *EPCRA Section 313 Reporting Guidance for Semiconductor Manufacturing*, EPA 745-R-99-007 (July, 1999).

26. *EPCRA Section 313 Reporting Guidance for Leather Tanning and Finishing Industry*, EPA 745-B-00-012 (April, 2000).

27. *EPCRA Section 313 Reporting Guidance for the Printing, Publishing, and Packaging Industry*, EPA 745-B-00-005 (May, 2000).

28. *EPCRA Section 313 Reporting Guidance for Rubber and Plastics Manufacturing*, EPA 745-B-00-017 (May, 2000).

29. *EPCRA Section 313 Reporting Guidance for the Textile Processing Industry*, EPA 745-B-00-008 (May, 2000).

30. *EPCRA Section 313 Reporting Guidance for the Presswood and Laminated Products Industry*, EPA 260-B-01-013 (August, 2001)

In addition, the U.S. EPA has developed a group of guidance documents specific to individual chemicals and chemical categories. Some of these documents are relevant to be used for reporting to the NPRI and are listed below.

31. *Guidance for Reporting Aqueous Ammonia – Revised*, EPA 745-R-00-005 (December, 2000).

32. *List of Toxic Chemicals Within The Water Dissociable Nitrate Compounds Category and Guidance for Reporting – Revised*, EPA 745-R-00-006 (December, 2000).

33. *Guidance for Reporting Sulfuric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)*, EPA 745-R-97-007 (November, 1997 and updated March, 1998).

34. *Guidance for Reporting Toxic Chemicals within the Polycyclic Aromatic Compounds Category (Final)*, EPA 260-B-01-03 (August, 2001).

35. *List of Toxic Chemicals within the Polychlorinated Alkanes Category and Guidance for Reporting*, EPA 745-B-99-023 (June, 1999).

36. *Guidance for Reporting Hydrochloric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)*, EPA 745-B-99-014 (December, 1999).

37. *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category (Final)*, EPA 260-B-01-004 (August, 2001).

Locating and Estimating (L&E) Documents

To assist groups interested in preparing inventories of air emissions of various potentially toxic substances, the U.S. EPA Office of Air Quality and Planning Standards has prepared a series of L&E documents that compiles available information on sources and emissions of these substances. Documents in this series are listed below.

SUBSTANCE	EPA PUBLICATION #	PUBLICATION DATE
38. Acrylonitrile	EPA-450/4-84-007a	1984
39. Arsenic and Arsenic Compounds	EPA-454/R-98-013	June 1998
40. Benzene	EPA-450/4-84-007q	1988
41. Benzene	EPA-450/R-98-011	June 1998
42. 1,3-Butadiene	EPA-454/R-96-008	November 1996
43. Cadmium and Cadmium Compounds	EPA-454/R-93-040	September 1993
44. Carbon Tetrachloride	EPA-450/4-84-007b	March 1984
45. Chlorobenzenes	EPA-454/R-93-044	March 1994
46. Chloroform	EPA-450/4-84-007c	March 1984
47. Chromium	EPA-450/4-84-007g	July 1984
48. Chromium (Supplement)	EPA-450/2-89-002	August 1989
49. Coal and Oil Combustion Sources	EPA 450/2-89-001	1989
50. Cyanide	EPA-454/R-93-041	September 1993
51. Dioxins and Furans	EPA-454/R-97-003	May 1997
52. Epichlorohydrin	EPA-450/4-84-007j	March 1984
53. Ethylene Dichloride	EPA-450/4-84-007d	March 1984
54. Ethylene Oxide	EPA-450/4-84-007l	September 1986
55. Formaldehyde	EPA-450/4-91-012	March 1991
56. Lead	EPA-454/R-98-006	May 1998
57. Manganese	EPA-450/4-84-007h	1986
58. Medical Waste Incinerators	EPA-454/R-93-053	1993
59. Mercury and Mercury Compounds	EPA-454/R-97-012	December 1997
60. Methylene Chloride	EPA-454/R-93-006	February 1993
61. Methyl Ethyl Ketone	EPA-454/R-93-046	March 1994
62. Municipal Waste Combustion	EPA-450/2-89-006	1989
63. Nickel	EPA-450/4-84-007f	1984
64. Organic Liquid Storage Tanks	EPA-450/4-88-004	1988
65. Perc and Trichloroethylene	EPA 450/2-89-013	1989
66. Phosgene	EPA-450/4-84-007i	1986
67. Polycyclic Organic Matter	EPA-454/R-98-014	July 1998
68. Sewage Sludge Incinerators	EPA 450/2-90-009	1990
69. Styrene	EPA-454/R-93-011	April 1993
70. Toluene	EPA-454/R-93-047	March 1994
71. Vinylidene Chloride	EPA-450/4-84-007k	September 1985
72. Xylene	EPA-454/R-93-048	March 1994

Other Documents from the U.S. EPA

73. *Compilation of Air Pollutant Emission Factors, Vol. 1: Stationary Point and Area Sources*, U.S. EPA, AP-42, 5th Edition (1996), and AP-42 Supplements A, B, C, D, E, and F (1996, 1997, 1998, 1999, and 2000).
74. *Toxic Air Pollutant Emission Factors – A Compilation for Selected Air Toxic Compounds and Sources, Second Edition*, U.S. EPA, EPA 450/2-90-011 (1990).
75. *Protocols for Equipment Leak Emission Estimates*, U.S. EPA, EPA 453/R-95-017 (November, 1995).
76. *Hot Mix Asphalt Plants - Emission Assessment Report (Draft)*, U.S. EPA, EPA 454/R-00-0XX (June, 2000).
77. *Development of Particulate and Hazardous Emission Factors for Electric Arc Welding (AP- 42, Section 12.19) Revised Final Report*, U.S. EPA, EPA (May, 1994).

Copies of the U.S. EPA documents are available from:

U.S. Environmental Protection Agency
National Center For Environmental Publications and Information (NCEPI)
P.O. Box 42419
Cincinnati, OH 45242
U.S.A.

Tel: (513) 489-8190,
Fax: (513) 489-8695

U.S. EPA documents can be downloaded from the U.S. Toxics Release Inventory (TRI) Web site at <www.epa.gov/tri> or the U.S. EPA's Technology Transfer Network Web site at <www.epa.gov/ttn/chief/>.

Or, they can be ordered from:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
U.S.A.

Tel: (703) 605-6000
Fax: (703) 605-6900
E-mail: orders@ntis.fedworld.gov
Web site: www.ntis.gov/

Documents Produced by Industry Associations

78. *Evaporation Loss from External Floating Roof Tanks*, American Petroleum Institute, Publication 2517 (1994).

79. *Evaporation Loss from Fixed Roof Tanks*, American Petroleum Institute, Chapter 19.1 (1991).

80. *Evaporation Loss from Internal Floating Roof Tanks*, American Petroleum Institute, Publication 2519 (1996).

81. *Review of Air Toxic Emission Calculations from Storage Tanks, Air Toxic Emissions Calculation Validation Program: Analysis of Crude Oil and Refined Product Samples and Comparison of Vapor Composition to Model Predictions*, American Petroleum Institute, Publication 2525 (1992).

Copies of the above reports can be ordered from:

American Petroleum Institute
Order Desk
1200 L Street Northwest
Washington, DC 20005
U.S.A.
Tel: (202) 682-8375
Fax: (202) 962-4776

82. Canadian Petroleum Products Institute "Code of Practice for Developing a Refinery Emission Inventory" available at <www.cppi.ca>.

Environment Canada Guidance Documents

83. Environment Canada (2003) "Guidance for Wood Preservation Facilities Reporting to the National Pollutant Release Inventory", in collaboration with the Canadian Institute of Treated Wood.

84. Environment Canada (2003) "Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory – 2002".

85. Environment Canada (2003), "National Pollutant Release Inventory Guidance Manual for the Wastewater Sector".

These and other guidance documents and tools can be downloaded from the NPRI Web site at <www.ec.gc.ca/pdb/npri>.

General Information

86. Howard, P. H. and M. Neal, *Dictionary of Chemical Names and Synonyms*, Lewis Publishers, Chelsea, MI (1992).

87. Lide, David R., *CRC Handbook of Chemistry and Physics, 75th Edition*, CRC Press, Inc., Boca Raton, FL (1995) pp. 15-38, *Characteristics of Particles and Particle Dispersoids.*

Appendix 1 – Alphabetical Listing of NPRI Substances for 2002

The substances are listed in five parts. **The changes in substance listings and the new substances added to the NPRI for 2002 are in bold lettering.** The reporting criteria for the substances listed in each Part differ and are explained in Step 1. Explanations of the footnotes and substance qualifiers are also provided in Step 1.

PART 1A SUBSTANCES

Name	CAS No.[1]	Name	CAS No.[1]
Acetaldehyde	75-07-0	Carbon tetrachloride	56-23-5
Acetonitrile	75-05-8	Catechol	120-80-9
Acetophenone	98-86-2	CFC-11	75-69-4
Acrolein	107-02-8	CFC-12	75-71-8
Acrylamide	79-06-1	CFC-13	75-72-9
Acrylic acid [2]	79-10-7	CFC-114	76-14-2
Acrylonitrile	107-13-1	CFC-115	76-15-3
Alkanes, C_{6-18}, chloro	68920-70-7	Chlorendic acid	115-28-6
Alkanes, C_{10-13}, chloro	85535-84-8	Chlorine	7782-50-5
Allyl alcohol	107-18-6	Chlorine dioxide	10049-04-4
Allyl chloride	107-05-1	Chloroacetic acid [2]	79-11-8
Aluminum [3]	7429-90-5	Chlorobenzene	108-90-7
Aluminum oxide [4]	1344-28-1	Chloroethane	75-00-3
Ammonia (total) [5]	*	Chloroform	67-66-3
Aniline [2]	62-53-3	Chloromethane	74-87-3
Anthracene	120-12-7	3-Chloro-2-methyl-1-propene	563-47-3
Antimony [6]	*	3-Chloropropionitrile	542-76-7
Asbestos [7]	1332-21-4	Chromium [8]	*
Benzene	71-43-2	Cobalt [6]	*
Benzoyl chloride	98-88-4	Copper [6]	*
Benzoyl peroxide	94-36-0	Cresol [2,9]	1319-77-3
Benzyl chloride	100-44-7	Crotonaldehyde	4170-30-3
Biphenyl	92-52-4	Cumene	98-82-8
Bis(2-ethylhexyl) adipate	103-23-1	Cumene hydroperoxide	80-15-9
Bis(2-ethylhexyl) phthalate	117-81-7	Cyanides [10]	*
Boron trifluoride	7637-07-2	Cyclohexane	110-82-7
Bromine	7726-95-6	Cyclohexanol	108-93-0
1-Bromo-2-chloroethane	107-04-0	Decabromodiphenyl oxide	1163-19-5
Bromomethane	74-83-9	2,4-Diaminotoluene [2]	95-80-7
1,3-Butadiene	106-99-0	2,6-Di-*t*-butyl-4-methylphenol	128-37-0
2-Butoxyethanol	111-76-2	Dibutyl phthalate	84-74-2
Butyl acrylate	141-32-2	*o*-Dichlorobenzene	95-50-1
i-Butyl alcohol	78-83-1	*p*-Dichlorobenzene	106-46-7
n-Butyl alcohol	71-36-3	3,3'-Dichlorobenzidine dihydrochloride	612-83-9
sec-Butyl alcohol	78-92-2	1,2-Dichloroethane	107-06-2
tert-Butyl alcohol	75-65-0	Dichloromethane	75-09-2
Butyl benzyl phthalate	85-68-7	2,4-Dichlorophenol [2]	120-83-2
1,2-Butylene oxide	106-88-7	1,2-Dichloropropane	78-87-5
Butyraldehyde	123-72-8	Dicyclopentadiene	77-73-6
C.I. Acid Green 3	4680-78-8	Diethanolamine [2]	111-42-2
C.I. Basic Green 4	569-64-2	Diethyl phthalate	84-66-2
C.I. Basic Red 1	989-38-8	Diethyl sulphate	64-67-5
C.I. Direct Blue 218	28407-37-6	Dimethylamine	124-40-3
C.I. Disperse Yellow 3	2832-40-8	N,N-Dimethylaniline [2]	121-69-7
C.I. Food Red 15	81-88-9	N,N-Dimethylformamide	68-12-2
C.I. Solvent Orange 7	3118-97-6	Dimethyl phenol	1300-71-6
C.I. Solvent Yellow 14	842-07-9	Dimethyl phthalate	131-11-3
Calcium cyanamide	156-62-7	Dimethyl sulphate	77-78-1
Calcium fluoride	7789-75-5	4,6-Dinitro-*o*-cresol [2]	534-52-1
Carbon disulphide	75-15-0	2,4-Dinitrotoluene	121-14-2

Name	CAS No.[1]
2,6-Dinitrotoluene	606-20-2
Dinitrotoluene [11]	25321-14-6
Di-*n*-octyl phthalate	117-84-0
1,4-Dioxane	123-91-1
Diphenylamine	122-39-4
Epichlorohydrin	106-89-8
2-Ethoxyethanol	110-80-5
2-Ethoxyethyl acetate	111-15-9
Ethoxynonyl benzene	28679-13-2
Ethyl acrylate	140-88-5
Ethylbenzene	100-41-4
Ethyl chloroformate	541-41-3
Ethylene	74-85-1
Ethylene glycol	107-21-1
Ethylene oxide	75-21-8
Ethylene thiourea	96-45-7
Fluorine	7782-41-4
Formaldehyde	50-00-0
Formic acid	64-18-6
Halon 1211	353-59-3
Halon 1301	75-63-8
HCFC-22	75-45-6
HCFC-122 and all isomers [12]	41834-16-6
HCFC-123 and all isomers [13]	34077-87-7
HCFC 124 and all isomers [14]	63938-10-3
HCFC-141b	1717-00-6
HCFC-142b	75-68-3
Hexachlorocyclopentadiene	77-47-4
Hexachloroethane	67-72-1
Hexachlorophene	70-30-4
n-Hexane	110-54-3
Hydrazine [2]	302-01-2
Hydrochloric acid	7647-01-0
Hydrogen cyanide	74-90-8
Hydrogen fluoride	7664-39-3
Hydrogen sulphide	7783-06-4
Hydroquinone [2]	123-31-9
Iron pentacarbonyl	13463-40-6
Isobutyraldehyde	78-84-2
Isophorone diisocyanate	4098-71-9
Isoprene	78-79-5
Isopropyl alcohol	67-63-0
p,p'-Isopropylidenediphenol	80-05-7
Isosafrole	120-58-1
Lithium carbonate	554-13-2
Maleic anhydride	108-31-6
Manganese [6]	*
2-Mercaptobenzothiazole	149-30-4
Methanol	67-56-1
2-Methoxyethanol	109-86-4
2-Methoxyethyl acetate	110-49-6
Methyl acrylate	96-33-3
Methyl *tert*-butyl ether	1634-04-4
p,p'-Methylene*bis*(2-chloroaniline)	101-14-4
1,1-Methylene*bis*(4-isocyanatocyclohexane)	5124-30-1
Methylene*bis*(phenylisocyanate)	101-68-8
p,p'-Methylenedianiline	101-77-9
Methyl ethyl ketone	78-93-3
Methyl iodide	74-88-4
Methyl isobutyl ketone	108-10-1
Methyl methacrylate	80-62-6
N-Methylolacrylamide	924-42-5
2-Methylpyridine	109-06-8
N-Methyl-2-pyrrolidone	872-50-4
Michler's ketone [2]	90-94-8
Molybdenum trioxide	1313-27-5
Naphthalene	91-20-3
Nickel [6]	*
Nitrate ion [15]	*
Nitric acid	7697-37-2
Nitrilotriacetic acid [2]	139-13-9
p-Nitroaniline	100-01-6
Nitrobenzene	98-95-3
Nitroglycerin	55-63-0
p-Nitrophenol [2]	100-02-7
2-Nitropropane	79-46-9
N-Nitrosodiphenylamine	86-30-6
Nonylphenol	104-40-5
Nonylphenol hepta(oxyethylene) ethanol	27177-05-5
Nonylphenol, industrial	84852-15-3
Nonylphenol nona(oxyethylene) ethanol	27177-08-8
n-Nonylphenol [11]	25154-52-3
Nonylphenol polyethylene glycol ether	9016-45-9
p-Nonylphenol polyethylene glycol ether	26027-38-3
Nonylphenoxy ethanol	27986-36-3
2-(*p*-Nonylphenoxy) ethanol	104-35-8
2-(2-(*p*-Nonylphenoxy)ethoxy) ethanol	20427-84-3
2-(2-(2-(2-(*p*-Nonylphenoxy) ethoxy)ethoxy)ethoxy) ethanol	7311-27-5
4-*tert*-octylphenol	140-66-9
Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl)ether	37251-69-7
Paraldehyde	123-63-7
Pentachloroethane	76-01-7
Peracetic acid [2]	79-21-0
Phenol [2]	108-95-2
p-Phenylenediamine [2]	106-50-3
o-Phenylphenol [2]	90-43-7
Phosgene	75-44-5
Phosphorus [16]	7723-14-0
Phthalic anhydride	85-44-9
Polymeric diphenylmethane diisocyanate	9016-87-9
Potassium bromate	7758-01-2
Propargyl alcohol	107-19-7
Propionaldehyde	123-38-6
Propylene	115-07-1
Propylene oxide	75-56-9
Pyridine [2]	110-86-1
Quinoline [2]	91-22-5
p-Quinone	106-51-4
Safrole	94-59-7
Selenium [6]	*
Silver [6]	*
Sodium fluoride	7681-49-4
Sodium nitrite	7632-00-0
Styrene	100-42-5
Styrene oxide	96-09-3
Sulphur hexafluoride	2551-62-4

Name	CAS No.[1]	Name	CAS No.[1]
Sulphuric acid	7664-93-9	1,1,2-Trichloroethane	79-00-5
1,1,1,2-Tetrachloroethane	630-20-6	Trichloroethylene	79-01-6
1,1,2,2-Tetrachloroethane	79-34-5	Triethylamine	121-44-8
Tetrachloroethylene	127-18-4	1,2,4-Trimethylbenzene	95-63-6
Tetracycline hydrochloride	64-75-5	2,2,4-Trimethylhexamethylene diisocyanate	16938-22-0
Thiourea	62-56-6	2,4,4-Trimethylhexamethylene diisocyanate	15646-96-5
Thorium dioxide	1314-20-1	Vanadium [17]	7440-62-2
Titanium tetrachloride	7550-45-0	Vinyl acetate	108-05-4
Toluene	108-88-3	Vinyl chloride	75-01-4
Toluene-2,4-diisocyanate	584-84-9	Vinylidene chloride	75-35-4
Toluene-2,6-diisocyanate	91-08-7	Xylene [18]	1330-20-7
Toluenediisocyanate [11]	26471-62-5	Zinc [6]	*
1,2,4-Trichlorobenzene	120-82-1		

[See Step 1 for an explanation of these qualifiers.]

* No single CAS number applies to this NPRI listing.
1 CAS Registry Number denotes the Chemical Abstracts Service Registry Number, as appropriate.
2 "and its salts" – The CAS number corresponds to the weak acid or base. However, the substance includes the salts of these weak acids and bases. When calculating the weight of these substances and their salts, use the molecular weight of the acid or base, not the total weight of the salt.
3 "fume or dust"
4 "fibrous forms"
5 "Ammonia (total)" means the total of both of ammonia (NH_3 – CAS No. 7664-41-7) and the ammonium ion (NH_4^+) in solution.
6 "and its compounds"
7 "friable form"
8 "and its compounds" except hexavalent chromium compounds
9 "all isomers" including, but not limited to, the individual isomers of cresol: *m*-cresol (CAS No. 108-39-4), *o*-cresol (CAS No. 95-48-7) and *p*-cresol (CAS No. 106-44-5)
10 "ionic"
11 "mixed isomers"
12 "all isomers" including, but not limited to, HCFC-122 (CAS No. 354-21-2).
13 "all isomers" including, but not limited to, HCFC-123 (CAS No. 306-83-2) and HCFC-123a (CAS No. 90454-18-5).
14 "all isomers" including, but not limited to, HCFC-124 (CAS No. 2837-89-0), and HCFC-124a (CAS No. 354-25-6).
15 "in solution at a pH of 6.0 or greater"
16 "yellow or white"
17 "(except when in an alloy) and its compounds"
18 "all isomers" including, but not limited to, the individual isomers of xylene: *m*-xylene (CAS No. 108-38-3), *o*-xylene (CAS No. 95-47-6) and *p*-xylene (CAS No. 106-42-3).

PART 1B SUBSTANCES

Name	CAS No.[1]	Name	CAS No.[1]
Mercury [6]	*	**Hexavalent chromium compounds**	*
Cadmium[6]	*	**Lead[19,20]**	*
Arsenic [6]	*	**Tetraethyl lead**	78-00-2

19 "and its compounds" except tetraethyl lead
20 Does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

PART 2 SUBSTANCES

Name	CAS No.[1]	Name	CAS No.[1]
Benzo(a)anthracene	56-55-3	Dibenzo(a,h)anthracene	53-70-3
Benzo(a)phenanthrene	218-01-9	Dibenzo(a,i)pyrene	189-55-9
Benzo(a)pyrene	50-32-8	7H-Dibenzo(c,g)carbazole	194-59-2
Benzo(b)fluoranthene	205-99-2	Fluoranthene	206-44-0
Benzo(e)pyrene	192-97-2	Indeno(1,2,3-c,d)pyrene	193-39-5
Benzo(g,h,i)perylene	191-24-2	Perylene	198-55-0
Benzo(j)fluoranthene	205-82-3	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0
Dibenz(a,j)acridine	224-42-0		

PART 3 SUBSTANCES

Name	CAS No.[1]	Name	CAS No.[1]
Hexachlorobenzene	118-74-1	Polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans [21]	*

[See Step 1 for an explanation of these qualifiers.]

21 This class of substances is restricted to the following congeners:
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (1746-01-6);
1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin (40321-76-4);
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin (39227-28-6);
1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin (19408-74-3);
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin (57653-85-7);
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (35822-46-9);
Octachlorodibenzo-*p*-dioxin (3268-87-9);
2,3,7,8-Tetrachlorodibenzofuran (51207-31-9);
2,3,4,7,8-Pentachlorodibenzofuran (57117-31-4);
1,2,3,7,8-Pentachlorodibenzofuran (57117-41-6);
1,2,3,4,7,8-Hexachlorodibenzofuran (70648-26-9);
1,2,3,7,8,9-Hexachlorodibenzofuran (72918-21-9);
1,2,3,6,7,8-Hexachlorodibenzofuran (57117-44-9);
2,3,4,6,7,8-Hexachlorodibenzofuran (60851-34-5);
1,2,3,4,6,7,8-Heptachlorodibenzofuran (67562-39-4);
1,2,3,4,7,8,9-Heptachlorodibenzofuran (55673-89-7); and
Octachlorodibenzofuran (39001-02-0).

PART 4 SUBSTANCES

Name	CAS No.[1]	Name	CAS No.[1]
Carbon monoxide	630-08-0	Sulphur dioxide	7446-09-5
Oxides of nitrogen (expressed as NO_2)	11104-93-1	Total particulate matter[24]	*
$PM_{2.5}$ [22]	*	Volatile organic compounds[25]	*
PM_{10} [23]	*		

22 means any particulate matter with a diameter less than or equal to 2.5 microns.
23 means any particulate matter with a diameter less than or equal to 10 microns.
24 means any particulate matter with a diameter less than 100 microns.
25 Refer to Appendix 3 of *Supplementary Guide for Reporting Criteria Air Contaminants (CACs)* to the National Pollutant Release Inventory for definition of VOCs.

Appendix 2 – NPRI Substances for 2002, Listed by Chemical Abstracts Service Registry Number

The changes in substance listings and the new substances added to the NPRI for 2002 are in **bold lettering**. Explanations of the footnotes and substance qualifiers are provided in Step 1.

Name	CAS No.[1]
Ammonia (total) [2]	*
Antimony [3]	*
Arsenic [3]	*
Cadmium [3]	*
Chromium [4]	*
Cobalt [3]	*
Copper [3]	*
Cyanides [5]	*
Hexavalent chromium compounds	*
Lead [6,7]	*
Manganese [3]	*
Mercury [3]	*
Nickel [3]	*
Nitrate ion [8]	*
$PM_{2.5}$ [9]	*
PM_{10} [10]	*
Polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans [11]	*
Selenium [3]	*
Silver [3]	*
Total particulate matter [12]	*
Volatile organic compounds [13]	*
Zinc [3]	*
Formaldehyde	50-00-0
Benzo(a)pyrene	50-32-8
Dibenzo(a,h)anthracene	53-70-3
Nitroglycerin	55-63-0
Carbon tetrachloride	56-23-5
Benzo(a)anthracene	56-55-3
Aniline [14]	62-53-3
Thiourea	62-56-6
Formic acid	64-18-6
Diethyl sulphate	64-67-5
Tetracycline hydrochloride	64-75-5
Methanol	67-56-1
Isopropyl alcohol	67-63-0
Chloroform	67-66-3
Hexachloroethane	67-72-1
N,N-Dimethylformamide	68-12-2
Hexachlorophene	70-30-4
n-Butyl alcohol	71-36-3
Benzene	71-43-2
Bromomethane	74-83-9
Ethylene	74-85-1
Chloromethane	74-87-3
Methyl iodide	74-88-4
Hydrogen cyanide	74-90-8
Chloroethane	75-00-3
Vinyl chloride	75-01-4
Acetonitrile	75-05-8
Acetaldehyde	75-07-0

Name	CAS No.[1]
Dichloromethane	75-09-2
Carbon disulphide	75-15-0
Ethylene oxide	75-21-8
Vinylidene chloride	75-35-4
Phosgene	75-44-5
HCFC-22	75-45-6
Propylene oxide	75-56-9
Halon 1301	75-63-8
tert-Butyl alcohol	75-65-0
HCFC-142b	75-68-3
CFC-11	75-69-4
CFC-12	75-71-8
CFC-13	75-72-9
Pentachloroethane	76-01-7
CFC-114	76-14-2
CFC-115	76-15-3
Hexachlorocyclopentadiene	77-47-4
Dicyclopentadiene	77-73-6
Dimethyl sulphate	77-78-1
Tetraethyl lead	78-00-2
Isoprene	78-79-5
i-Butyl alcohol	78-83-1
Isobutyraldehyde	78-84-2
1,2-Dichloropropane	78-87-5
sec-Butyl alcohol	78-92-2
Methyl ethyl ketone	78-93-3
1,1,2-Trichloroethane	79-00-5
Trichloroethylene	79-01-6
Acrylamide	79-06-1
Acrylic acid [14]	79-10-7
Chloroacetic acid [14]	79-11-8
Peracetic acid [14]	79-21-0
1,1,2,2-Tetrachloroethane	79-34-5
2-Nitropropane	79-46-9
p,p'-Isopropylidenediphenol	80-05-7
Cumene hydroperoxide	80-15-9
Methyl methacrylate	80-62-6
C.I. Food Red 15	81-88-9
Diethyl phthalate	84-66-2
Dibutyl phthalate	84-74-2
Phenanthrene	85-01-8
Phthalic anhydride	85-44-9
Butyl benzyl phthalate	85-68-7
N-Nitrosodiphenylamine	86-30-6
o-Phenylphenol [14]	90-43-7
Michler's ketone [14]	90-94-8
Toluene-2,6-diisocyanate	91-08-7
Naphthalene	91-20-3
Quinoline [14]	91-22-5
Biphenyl	92-52-4
Benzoyl peroxide	94-36-0

Name	CAS No.[1]
Safrole	94-59-7
o-Dichlorobenzene	95-50-1
1,2,4-Trimethylbenzene	95-63-6
2,4-Diaminotoluene [14]	95-80-7
Styrene oxide	96-09-3
Methyl acrylate	96-33-3
Ethylene thiourea	96-45-7
Cumene	98-82-8
Acetophenone	98-86-2
Benzoyl chloride	98-88-4
Nitrobenzene	98-95-3
p-Nitroaniline	100-01-6
p-Nitrophenol [14]	100-02-7
Ethylbenzene	100-41-4
Styrene	100-42-5
Benzyl chloride	100-44-7
p,p'-Methylene*bis*(2-chloroaniline)	101-14-4
Methylene*bis*(phenylisocyanate)	101-68-8
p,p'-Methylenedianiline	101-77-9
Bis(2-ethylhexyl) adipate	103-23-1
2-(*p*-Nonylphenoxy) ethanol	104-35-8
Nonylphenol	104-40-5
p-Dichlorobenzene	106-46-7
p-Phenylenediamine [14]	106-50-3
p-Quinone	106-51-4
1,2-Butylene oxide	106-88-7
Epichlorohydrin	106-89-8
1,3-Butadiene	106-99-0
Acrolein	107-02-8
1-Bromo-2-chloroethane	107-04-0
Allyl chloride	107-05-1
1,2-Dichloroethane	107-06-2
Acrylonitrile	107-13-1
Allyl alcohol	107-18-6
Propargyl alcohol	107-19-7
Ethylene glycol	107-21-1
Vinyl acetate	108-05-4
Methyl isobutyl ketone	108-10-1
Maleic anhydride	108-31-6
Toluene	108-88-3
Chlorobenzene	108-90-7
Cyclohexanol	108-93-0
Phenol [14]	108-95-2
2-Methylpyridine	109-06-8
2-Methoxyethanol	109-86-4
2-Methoxyethyl acetate	110-49-6
n-Hexane	110-54-3
2-Ethoxyethanol	110-80-5
Cyclohexane	110-82-7
Pyridine [14]	110-86-1
2-Ethoxyethyl acetate	111-15-9
Diethanolamine [14]	111-42-2
2-Butoxyethanol	111-76-2
Propylene	115-07-1
Chlorendic acid	115-28-6
Bis(2-ethylhexyl) phthalate	117-81-7
Di-*n*-octyl phthalate	117-84-0
Hexachlorobenzene	118-74-1
Anthracene	120-12-7
Isosafrole	120-58-1
Catechol	120-80-9
1,2,4-Trichlorobenzene	120-82-1
2,4-Dichlorophenol [14]	120-83-2
2,4-Dinitrotoluene	121-14-2
Triethylamine	121-44-8
N,N-Dimethylaniline [14]	121-69-7
Diphenylamine	122-39-4
Hydroquinone [14]	123-31-9
Propionaldehyde	123-38-6
Paraldehyde	123-63-7
Butyraldehyde	123-72-8
1,4-Dioxane	123-91-1
Dimethylamine	124-40-3
Tetrachloroethylene	127-18-4
2,6-Di-*t*-butyl-4-methylphenol	128-37-0
Pyrene	129-00-0
Dimethyl phthalate	131-11-3
Nitrilotriacetic acid [14]	139-13-9
4-*tert*-octylphenol	140-66-9
Ethyl acrylate	140-88-5
Butyl acrylate	141-32-2
2-Mercaptobenzothiazole	149-30-4
Calcium cyanamide	156-62-7
Dibenzo(a,i)pyrene	189-55-9
Benzo(g,h,i)perylene	191-24-2
Benzo(e)pyrene	192-97-2
Indeno(1,2,3-c,d)pyrene	193-39-5
7H-Dibenzo(c,g)carbazole	194-59-2
Perylene	198-55-0
Benzo(j)fluoranthene	205-82-3
Benzo(b)fluoranthene	205-99-2
Fluoranthene	206-44-0
Benzo(k)fluoranthene	207-08-9
Benzo(a)phenanthrene	218-01-9
Dibenz(a,j)acridine	224-42-0
Hydrazine [14]	302-01-2
Halon 1211	353-59-3
4,6-Dinitro-*o*-cresol [14]	534-52-1
Ethyl chloroformate	541-41-3
3-Chloropropionitrile	542-76-7
Lithium carbonate	554-13-2
3-Chloro-2-methyl-1-propene	563-47-3
C.I. Basic Green 4	569-64-2
Toluene-2,4-diisocyanate	584-84-9
2,6-Dinitrotoluene	606-20-2
3,3'-Dichlorobenzidine dihydrochloride	612-83-9
Carbon monoxide	**630-08-0**
1,1,1,2-Tetrachloroethane	630-20-6
C.I. Solvent Yellow 14	842-07-9
N-Methyl-2-pyrrolidone	872-50-4
N-Methylolacrylamide	924-42-5
C.I. Basic Red 1	989-38-8
Decabromodiphenyl oxide	1163-19-5
Dimethyl phenol	1300-71-6
Molybdenum trioxide	1313-27-5
Thorium dioxide	1314-20-1
Cresol [14,15]	1319-77-3
Xylene [16]	1330-20-7

Name	CAS No.[1]
Asbestos [17]	1332-21-4
Aluminum oxide [18]	1344-28-1
Methyl *tert*-butyl ether	1634-04-4
HCFC-141b	1717-00-6
Sulphur hexafluoride	2551-62-4
C.I. Disperse Yellow 3	2832-40-8
C.I. Solvent Orange 7	3118-97-6
Isophorone diisocyanate	4098-71-9
Crotonaldehyde	4170-30-3
C.I. Acid Green 3	4680-78-8
1,1-Methylene*bis*(4-isocyanatocyclohexane)	5124-30-1
2-(2-(2-(2-(*p*-Nonylphenoxy) ethoxy)ethoxy)ethoxy) ethanol	7311-27-5
Aluminum [19]	7429-90-5
Vanadium [20]	7440-62-2
Sulphur dioxide	**7446-09-5**
Titanium tetrachloride	7550-45-0
Sodium nitrite	7632-00-0
Boron trifluoride	7637-07-2
Hydrochloric acid	7647-01-0
Hydrogen fluoride	7664-39-3
Sulphuric acid	7664-93-9
Sodium fluoride	7681-49-4
Nitric acid	7697-37-2
Phosphorus [21]	7723-14-0
Bromine	7726-95-6
Potassium bromate	7758-01-2
Fluorine	7782-41-4
Chlorine	7782-50-5
Hydrogen sulphide	7783-06-4
Calcium fluoride	7789-75-5
Nonylphenol polyethylene glycol ether	9016-45-9
Polymeric diphenylmethane diisocyanate	9016-87-9
Chlorine dioxide	10049-04-4
Oxides of nitrogen (expressed as NO_2)	**11104-93-1**
Iron pentacarbonyl	13463-40-6
2,4,4-Trimethylhexamethylene diisocyanate	15646-96-5
2,2,4-Trimethylhexamethylene diisocyanate	16938-22-0
2-(2-(*p*-Nonylphenoxy)ethoxy) ethanol	20427-84-3
n-Nonylphenol [22]	25154-52-3
Dinitrotoluene [22]	25321-14-6
p-Nonylphenol polyethylene glycol ether	26027-38-3
Toluenediisocyanate [22]	26471-62-5
Nonylphenol hepta(oxyethylene) ethanol	27177-05-5
Nonylphenol nona(oxyethylene) ethanol	27177-08-8
Nonylphenoxy ethanol	27986-36-3
C.I. Direct Blue 218	28407-37-6
Ethoxynonyl benzene	28679-13-2
HCFC-123 and all isomers [23]	34077-87-7
Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl)ether	37251-69-7
HCFC-122 and all isomers [24]	41834-16-6
HCFC-124 and all isomers [25]	63938-10-3
Alkanes, C_{9-18}, chloro	68920-70-7
Nonylphenol, industrial	84852-15-3
Alkanes, C_{10-13}, chloro	85535-84-8

[See Step 1 for an explanation of these qualifiers.]

* No single CAS number applies to this NPRI listing.

1 CAS Registry Number denotes the Chemical Abstracts Service Registry Number, as appropriate.

2 "Ammonia (total)" means the total of both of ammonia (NH_3 – CAS No. 7664-41-7) and the ammonium ion (NH_4^+) in solution.

3 "and its compounds"

4 "and its compounds" except hexavalent chromium compounds

5 "ionic"

6 "and its compounds" except tetraethyl lead

7 Does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

8 "in solution at a pH of 6.0 or greater"

9 means any particulate matter with a diameter less than or equal to 2.5 microns

10 means any particulate matter with a diameter less than or equal to 10 microns

11 This class of substances is restricted to the following congeners:
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (1746-01-6);
1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin (40321-76-4);
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin (39227-28-6);
1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin (19408-74-3);
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin (57653-85-7);
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (35822-46-9);
Octachlorodibenzo-*p*-dioxin (3268-87-9);
2,3,7,8-Tetrachlorodibenzofuran (51207-31-9);
2,3,4,7,8-Pentachlorodibenzofuran (57117-31-4);
1,2,3,7,8-Pentachlorodibenzofuran (57117-41-6);
1,2,3,4,7,8-Hexachlorodibenzofuran (70648-26-9);
1,2,3,7,8,9-Hexachlorodibenzofuran (72918-21-9);
1,2,3,6,7,8-Hexachlorodibenzofuran (57117-44-9);
2,3,4,6,7,8-Hexachlorodibenzofuran (60851-34-5);
1,2,3,4,6,7,8-Heptachlorodibenzofuran (67562-39-4);
1,2,3,4,7,8,9-Heptachlorodibenzofuran (55673-89-7); and
Octachlorodibenzofuran (39001-02-0).

12 means any particulate matter with a diameter of less than 100 microns

13 Refer to Appendix 3 of *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory* for definition of VOCs.

14 "and its salts" – The CAS number corresponds to the weak acid or base. However, the substance includes the salts of these weak acids and bases. When calculating the weight of these substances and their salts, use the molecular weight of the acid or base, not the total weight of the salt.

15 "all isomers" including, but not limited to, the individual isomers of cresol: *m*-cresol (CAS No. 108-39-4), *o*-cresol (CAS No. 95-48-7) and *p*-cresol (CAS No. 106-44-5)
16 "all isomers" including, but not limited to, the individual isomers of xylene: *m*-xylene (CAS No. 108-38-3), *o*-xylene (CAS No. 95-47-6) and *p*-xylene (CAS No. 106-42-3).
17 "friable form"
18 "fibrous forms"
19 "fume or dust"
20 "(except when in an alloy) and its compounds"
21 "yellow or white"
22 "mixed isomers"
23 "all isomers" including, but not limited to, HCFC-123 (CAS No. 306-83-2) and HCFC 123a (CAS No. 90454-18-5).
24 "all isomers" including, but not limited to, HCFC-122 (CAS No. 354-21-2).
25 "all isomers" including, but not limited to, HCFC 124 (CAS No. 2837-89-0) and HCFC 124a (CAS No. 354-25-6).

Appendix 3 – ARET 2 Substance List

The ARET 2 substance list, given below, contains the complete list of original ARET substances, substances listed as toxic on Schedule 1 of the *Canadian Environmental Protection Act, 1999* (CEPA 1999), and all of the NPRI-listed substances. This list is not static; it may change as substances are added to Schedule 1 of the CEPA 1999, and as substances are added to the NPRI. The most up-to-date list can be obtained on the ARET 2 Web site at <www.ec.gc.ca/aret>.

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
*	(4-Chlorophenyl)cyclopropylmethanone,O-[(4-trophenyl)methyl]oxime		x	
*	Ammonia (total)[2]			x
*	Antimony (and its compounds)			x
*	Arsenic (and its compounds)	x	x	x
*	Bromofluorocarbons[3]		x	
*	Cadmium (and its compounds)	x	x	x
*	CEPA-toxic substance #13 [4]		x	
*	Chlorinated wastewater effluents		x	
*	Chromium (and its compounds)[5]	x		x
*	Cobalt (and its compounds)	x		x
*	Copper (and its compounds)	x		x
*	Creosote-impregnated waste materials from creosote-contaminated sites		x	
*	Cyanides (ionic)	x		x
*	Effluents from pulp mills using bleaching		x	
*	Hexavalent chromium compounds	x	x	x
*	Lead (and its compounds)[6,7]	x	x	x
*	Manganese (and its compounds)			x
*	Mercury (and its compounds)[8]	x	x	x
*	Nickel (and its compounds)	x	x	x
*	Nitrate ion in solution at pH ≥ 6.0			x
*	PM - Particulate Matter[9]			x
*	PM10 - Particulate Matter ≤ 10 Micrometres		x	x
*	PM2.5 - Particulate Matter ≤ 2.5 Micrometres			x
*	Polichlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans[10]	x	x	x
*	Refractory ceramic fibres (RCF)		x	
*	Selenium (and its compounds)			x
*	Silver (and its compounds)	x		x
*	Tributyltetradecylphosphonium		x	
*	Uranium (inorganic/respirable/soluble)	x		
*	Volatile Organic Compounds (VOCs)[11]			x
*	Zinc (and its compounds)	x		x
100-00-5	1-Chloro-4-nitrobenzene	x		
100-01-6	*p*-Nitroaniline			x
100-02-7	*p*-Nitrophenol (and its salts)			x
100-41-4	Ethylbenzene			x
100-42-5	Styrene			x
100-44-7	Benzyl chloride	x		x
10049-04-4	Chlorine dioxide	x		x
101-14-4	*p,p'*-Methylene*bis*(2-chloroaniline)	x		x
101-68-8	Methylene*bis*(phenylisocyanate)			x
101-77-9	*p,p'*-Methylenedianiline			x
103-23-1	*Bis*(2-ethylhexyl) adipate			x
104-35-8	2-(*p*-Nonylphenoxy) ethanol			x
104-40-5	Nonylphenol			x
106-46-7	*p*-Dichlorobenzene	x		x
106-50-3	*p*-Phenylenediamine (and its salts)			x
106-51-4	p-Quinone			x
106-88-7	1,2-Butylene oxide			x

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
106-89-8	Epichlorohydrin	X		X
106-93-4	1,2-Dibromoethane	X		
106-99-0	1,3-Butadiene	X	X	X
107-02-8	Acrolein	X		X
107-04-0	1-Bromo-2-chloroethane	X		X
107-05-1	Allyl chloride			X
107-06-2	1,2-Dichloroethane	X	X	X
107-13-1	Acrylonitrile	X	X	X
107-18-6	Allyl alcohol			X
107-19-7	Propargyl alcohol			X
107-21-1	Ethylene glycol			X
107-30-2	Chloromethyl methyl ether		X	
108-05-4	Vinyl acetate			X
108-10-1	Methyl isobutyl ketone	X		X
108-31-6	Maleic anhydride			X
108-88-3	Toluene			X
108-90-7	Chlorobenzene			X
108-93-0	Cyclohexanol			X
108-95-2	Phenol (and its salts)	X		X
109-06-8	2-Methylpyridine	X		X
109-86-4	2-Methoxyethanol			X
110-49-6	2-Methoxyethyl acetate			X
110-54-3	*n*-Hexane			X
110-80-5	2-Ethoxyethanol			X
110-82-7	Cyclohexane			X
110-86-1	Pyridine (and its salts)			X
11104-93-1	Oxides of nitrogen (expressed as NO_2)			X
111-15-9	2-Ethoxyethyl acetate			X
111-42-2	Diethanolamine (and its salts)			X
111-44-4	*Bis*(2-chloroethyl) ether	X		
111-76-2	2-Butoxyethanol			X
112-40-3	*n*-Dodecane	X		
115-07-1	Propylene			X
115-28-6	Chlorendic acid			X
1163-19-5	Decabromodiphenyl oxide			X
117-81-7	*Bis*(2-ethylhexyl) phthalate	X	X	X
117-84-0	Di-*n*-octyl phthalate			X
118-74-1	Hexachlorobenzene	X	X	X
120-12-7	Anthracene	X		X
120-58-1	Isosafrole			X
120-80-9	Catechol			X
120-82-1	1,2,4-Trichlorobenzene			X
120-83-2	2,4-Dichlorophenol (and its salts)	X		X
121-14-2	2,4-Dinitrotoluene	X		X
121-44-8	Triethylamine			X
121-69-7	N,N-Dimethylaniline (and its salts)			X
122-39-4	Diphenylamine			X
122-66-7	1,2-Diphenylhydrazine (Hydrazobenzene)	X		
123-31-9	Hydroquinone (and its salts)			X
123-38-6	Propionaldehyde			X
123-63-7	Paraldehyde			X
123-72-8	Butyraldehyde			X
123-91-1	1,4-Dioxane	X		X
124-40-3	Dimethylamine			X
124-48-1	Chlorodibromomethane	X		
124-73-2	Dibromotetrafluoroethane (Halon 2402)		X	
127-18-4	Tetrachloroethylene	X	X	X
128-37-0	2,6-Di-*t*-butyl-4-methylphenol			X

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
129-00-0	Pyrene	X	X	X
1300-71-6	Dimethyl phenol	X		X
131-11-3	Dimethyl phthalate			X
1313-27-5	Molybdenum trioxide			X
1314-20-1	Thorium dioxide			X
1319-77-3	Cresol (mixed isomers and their salts)[12]			X
1330-20-7	Xylene (mixed isomers)[13]			X
1332-21-4	Asbestos (friable form)	X	X	X
1336-36-3	PolyChlorinated Biphenyls (PCBs)	X	X	
1344-28-1	Aluminum oxide (fibrous forms)			X
13463-40-6	Iron pentacarbonyl			X
137-26-8	Tetramethylthiuram disulphide	X		
139-13-9	Nitrilotriacetic acid (and its salts)			X
140-66-9	4-*tert*-Octylphenol			X
140-88-5	Ethyl acrylate			X
141-32-2	Butyl acrylate			X
149-30-4	2-Mercaptobenzothiazole			X
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate			X
156-62-7	Calcium cyanamide			X
1634-04-4	Methyl *tert*-butyl ether			X
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate			X
1717-00-6	HCFC-141b		X	X
189-55-9	Dibenzo(a,i)pyrene	X	X	X
191-24-2	Benzo(g,h,i)perylene	X		X
192-97-2	Benzo(e)pyrene	X	X	X
193-39-5	Indeno(1,2,3-cd)pyrene	X	X	X
194-59-2	7H-Dibenzo(c,g)carbazole	X	X	X
198-55-0	Perylene	X	X	X
20427-84-3	2-(2-(*p*-Nonylphenoxy)ethoxy) ethanol			X
205-82-3	Benzo(j)fluoranthene	X	X	X
205-99-2	Benzo(b)fluoranthene	X	X	X
206-44-0	Fluoranthene	X	X	X
207-08-9	Benzo(k)fluoranthene	X	X	X
218-01-9	Benzo(a)phenanthrene	X	X	X
224-42-0	Dibenz(a,j)acridine	X	X	X
226-36-8	Dibenz(a,h)acridine	X		
22967-92-6	Methyl mercury	X		
2385-85-5	Dodecachloropentacyclo [5.3.0.02,6.03,9.04,8] decane		X	
238-84-6	Benzo(a)fluorene	X		
25154-52-3	*n*-Nonylphenol (mixed isomers)			X
25321-14-6	Dinitrotoluene (mixed isomers)			X
2551-62-4	Sulphur hexafluoride		X	X
26027-38-3	*p*-Nonylphenol polyethylene glycol ether			X
26471-62-5	Toluenediisocyanate (mixed isomers)	X		X
27177-05-5	Nonylphenol hepta(oxyethylene) ethanol			X
27177-08-8	Nonylphenol nona(oxyethylene) ethanol			X
27986-36-3	Nonylphenoxy ethanol			X
2832-40-8	C.I. Disperse Yellow 3			X
28407-37-6	C.I. Direct Blue 218			X
28679-13-2	Ethoxynonyl benzene			X
28804-88-8	Dimethylnaphthalene	X		
29082-74-4	Octachlorostyrene	X		
302-01-2	Hydrazine (and its salts)	X		X
30777-19-6	Benzo(b)fluorene	X		
3118-97-6	C.I. Solvent Orange 7			X
319-84-6	Hexachlorocyclohexane	X		
34077-87-7	HCFC-123 and all isomers[14]		X	X

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
353-59-3	Halon 1211		x	x
37251-69-7	Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl)ether			x
4098-71-9	Isophorone diisocyanate			x
4170-30-3	Crotonaldehyde			x
41834-16-6	HCFC-122 and all isomers[15]		x	x
42397-64-8	1,6-Dinitropyrene	x		
42397-65-9	1,8-Dinitropyrene	x		
4680-78-8	C.I. Acid Green 3			x
50-00-0	Formaldehyde	x		x
50-32-8	Benzo(a)pyrene	x	x	x
5124-30-1	1,1-Methylene*bis*(4-isocyanatocyclohexane)			x
534-52-1	4,6-Dinitro-*o*-cresol (and its salts)	x		x
53-70-3	Dibenzo(a,h)anthracene	x	x	x
541-41-3	Ethyl chloroformate			x
542-75-6	1,3-Dichloropropene	x		
542-76-7	3-Chloropropiomitrile			x
542-88-1	*Bis*(chloromethyl) ether	x		
554-13-2	Lithium carbonate			x
55-63-0	Nitroglycerin			x
56-23-5	Carbon tetrachloride	x	x	x
563-47-3	3-Chloro-2-methyl-1-propene			x
56-55-3	Benzo(a)anthracene	x	x	x
569-64-2	C.I. Basic Green 4			x
576-26-1	1,6-Dimethylphenol	x		
57-97-6	7,12-Dimethylbenz(a)anthracene	x		
584-84-9	Toluene-2,4-diisocyanate			x
58-89-9	gamma-Hexachlorocyclohexane (Lindane)	x		
58-90-2	2,3,4,6-Tetrachlorophenol	x		
593-60-2	Vinyl bromide	x		
59-89-2	N-Nitrosomorpholine	x		
60-09-3	4-Aminoazobenzene	x		
60-35-5	Acetamide	x		
606-20-2	2,6-Dinitrotoluene	x		x
612-83-9	3,3'-Dichlorobenzidine dihydrochloride		x	x
621-64-7	N-Nitrosodi-*n*-propylamine	x		
62-53-3	Aniline (and its salts)	x		x
62-56-6	Thiourea	x		x
62-75-9	N-Nitrosodimethylamine	x		
630-08-0	Carbon monoxide			x
630-20-6	1,1,1,2-Tetrachloroethane			x
63938-10-3	HCFC-124 and all isomers[16]		x	x
64-17-5	Ethanol	x		
64-18-6	Formic acid			x
64-67-5	Diethyl sulphate			x
64-75-5	Tetracycline hydrochloride			x
67-56-1	Methanol			x
67-63-0	Isopropyl alcohol			x
67-66-3	Chloroform	x		x
67-72-1	Hexachloroethane			x
68-12-2	N,N-Dimethylformamide			x
688-73-3	Tributyltin	x		
68920-70-7	Alkanes, C_{n-18}, chloro			x
70-30-4	Hexachlorophene			x
71-36-3	*n*-Butyl alcohol			x
71-43-2	Benzene	x	x	x
71-55-6	1,1,1-Trichloroethane/methyl chloroform		x	
7311-27-5	2-(2-(2-(2-(*p*-Nonylphenoxy)ethoxy)ethoxy)ethoxy)ethanol			x
7429-90-5	Aluminum (fume or dust)			x

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
7440-41-7	Beryllium (and its compounds)	x		
7440-62-2	Vanadium (except when in an alloy) and its compounds			x
7446-09-5	Sulphur dioxide			x
74-83-9	Bromomethane		x	x
74-85-1	Ethylene			x
74-87-3	Chloromethane			x
74-88-4	Methyl iodide			x
74-90-8	Hydrogen cyanide			x
74-97-5	Bromochloromethane		x	
75-00-3	Chloroethane			x
75-01-4	Vinyl chloride		x	x
75-05-8	Acetonitrile			x
75-07-0	Acetaldehyde	x	x	x
75-09-2	Dichloromethane	x	x	x
75-15-0	Carbon disulphide			x
75-21-8	Ethylene oxide	x		x
75-27-4	Dichlorobromomethane	x		
75-35-4	Vinylidene chloride			x
75-44-5	Phosgene			x
75-45-6	HCFC-22		x	x
7550-45-0	Titanium tetrachloride			x
75-56-9	Propylene oxide			x
75-63-8	Halon 1301		x	x
75-65-0	*tert*-Butyl alcohol			x
75-68-3	HCFC-142b		x	x
75-69-4	CFC-11		x	x
75-71-8	CFC-12		x	x
75-72-9	CFC-13		x	x
76-01-7	Pentachloroethane			x
760-23-6	1,2-Dichlorobut-3-ene	x		
76-14-2	CFC-114		x	x
76-15-3	CFC-115		x	x
7632-00-0	Sodium nitrite			x
7637-07-2	Boron trifluoride			x
7647-01-0	Hydrochloric acid			x
7664-39-3	Hydrogen fluoride		x	x
7664-93-9	Sulphuric acid			x
7681-49-4	Sodium fluoride		x	x
7697-37-2	Nitric acid			x
7723-14-0	Phosphorus (yellow or white)			x
7726-95-6	Bromine			x
77-47-4	Hexachlorocyclopentadiene	x		x
7758-01-2	Potassium bromate			x
77-73-6	Dicyclopentadiene			x
77-78-1	Dimethyl sulphate			x
7782-41-4	Fluorine			x
7782-50-5	Chlorine			x
7783-06-4	Hydrogen sulphide	x		x
7789-75-5	Calcium fluoride		x	x
78-00-2	Tetraethyl lead	x	x	x
78-79-5	Isoprene			x
78-83-1	*i*-Butyl alcohol			x
78-84-2	Isobutyraldehyde			x
78-87-5	1,2-Dichloropropane			x
78-92-2	*sec*-Butyl alcohol			x
78-93-3	Methyl ethyl ketone			x
79-00-5	1,1,2-Trichloroethane			x
79-01-6	Trichloroethylene	x	x	x

CAS NO.[1]	SUBSTANCE	ORIGINAL ARET	CEPA-TOXIC	NPRI
79-06-1	Acrylamide	X	X	X
79-10-7	Acrylic acid (and its salts)			X
79-11-8	Chloroacetic acid (and its salts)			X
79-21-0	Peracetic acid (and its salts)			X
79-34-5	1,1,2,2-Tetrachloroethane			X
79-46-9	2-Nitropropane	X		X
80-05-7	*p,p'*-Isopropylidenediphenol			X
80-15-9	Cumene hydroperoxide			X
80-62-6	Methyl methacrylate			X
81-88-9	C.I. Food Red 15			X
842-07-9	C.I. Solvent Yellow 14			X
84-66-2	Diethyl phthalate			X
84-74-2	Dibutyl phthalate			X
84852-15-3	Nonylphenol, industrial			X
85-01-8	Phenanthrene	X	X	X
85-44-9	Phthalic anhydride			X
85535-84-8	Alkanes, C_{10-13} chloro			X
85-68-7	Butyl benzyl phthalate			X
86-30-6	N-Nitrosodiphenylamine	X		X
872-50-4	N-Methyl-2-pyrrolidone			X
87-86-5	Pentachlorophenol (PCP)	X		
88-06-2	2,4,6-Trichlorophenol	X		
90-04-0	*o*-Anisidine	X		
9016-45-9	Nonylphenol polyethylene glycol ether			X
9016-87-9	Polymeric diphenylmethane diisocyanate			X
90-43-7	*o*-Phenylphenol (and its salts)			X
90-94-8	Michler's ketone (and its salts)			X
91-08-7	Toluene-2,6-diisocyanate			X
91-20-3	Naphthalene			X
91-22-5	Quinoline (and its salts)	X		X
91-59-8	beta-Naphthylamine	X		
91-94-1	3,3-Dichlorobenzidine	X	X	
924-42-5	N-Methylolacrylamide			X
92-52-4	Biphenyl			X
92-67-1	4-Aminobiphenyl	X		
92-87-5	Benzidine	X	X	
94-36-0	Benzoyl peroxide			X
94-59-7	Safrole			X
95-50-1	*o*-Dichlorobenzene			X
95-63-6	1,2,4-Trimethylbenzene			X
95-80-7	2,4-Diaminotoluene (and its salts)			X
96-09-3	Styrene oxide			X
96-12-8	1,2-Dibromo-3-chloropropane(DBCP)	X		
96-33-3	Methyl acrylate			X
96-45-7	Ethylene thiourea	X		X
98-82-8	Cumene			X
98-86-2	Acetophenone			X
98-88-4	Benzoyl chloride			X
989-38-8	C.I. Basic Red 1			X
98-95-3	Nitrobenzene			X

* No single CAS number applies to this listing.

1 CAS Registry Number denotes the Chemical Abstracts Service Registry Number, as appropriate.

2 "Ammonia (total)" means the total of both of ammonia (NH_3 – CAS No. 7664-41-7) and the ammonium ion (NH_4^+) in solution.

3 bromofluorocarbons other than those already included on this list: Halon 2402 (Dibromotetrafluoroethane, CAS No. 124-73-2) Halon 1301 (Bromotrifluoromethane CAS No. 75-63-8) and Halon 1211 (Bromochlorodifluoromethane CAS No. 3153-59-3).

4 listed on CEPA 1999, Schedule 1 as:
Fuel containing toxic substances that are dangerous goods within the meaning of section 2 of the *Transportation of Dangerous Goods Act*, 1992 and that
a) are neither normal components of the fuel nor additives designed to improve the characteristics or the performance of the fuel; or
b) are normal components of the fuel or additives designed to improve the characteristics or performance of the fuels, but are present in quantities or concentrations greater than those generally accepted by industry standards.

5 "and its compounds" except hexavalent chromium compounds

6 "and its compounds" except tetraethyl lead

7 does not include lead (and its compounds) contained in stainless steel, brass or bronze alloys

8 "and its compounds" except methyl mercury

9 means any particulate matter with a diameter of less than 100 microns.

10 This class of substances is restricted to the following congeners:
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (1746-01-6);
1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin (40321-76-4);
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin (39227-28-6);
1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin (19408-74-3);
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (57653-85-7);
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (35822-46-9);
Octachlorodibenzo-*p*-dioxin (3268-87-9);
2,3,7,8-Tetrachlorodibenzofuran (51207-31-9);
2,3,4,7,8-Pentachlorodibenzofuran (57117-31-4);
1,2,3,7,8-Pentachlorodibenzofuran (57117-41-6);
1,2,3,4,7,8-Hexachlorodibenzofuran (70648-26-9);
1,2,3,7,8,9-Hexachlorodibenzofuran (72918-21-9);
1,2,3,6,7,8-Hexachlorodibenzofuran (57117-44-9);
2,3,4,6,7,8-Hexachlorodibenzofuran (60851-34-5);
1,2,3,4,6,7,8-Heptachlorodibenzofuran (67562-39-4);
1,2,3,4,7,8,9-Heptachlorodibenzofuran (55673-89-7); and
Octachlorodibenzofuran (39001-02-0).

11 refer to Appendix 3 of *Supplementary Guide for Reporting Criteria Air Contaminants (CACs) to the National Pollutant Release Inventory* for definition of VOCs.

12 "all isomers" including, but not limited to, the individual isomers of cresol: *m*-cresol (CAS No. 108-39-4), *o*-cresol (CAS No. 95-48-7) and *p*-cresol (CAS No. 106-44-5).

13 "all isomers" including, but not limited to, the individual isomers of xylene: *m*-xylene (CAS No. 108-38-3), *o*-xylene (CAS No. 95-47-6) and *p*-xylene (CAS No. 106-42-3).

14 "all isomers" including, but not limited to HCFC-123 (CAS No. 306-83-2) and HCFC-123a (CAS No. 90454-18-5).

15 "all isomers" including, but not limited to, HCFC-122 (CAS No. 354-21-2).

16 "all isomers" including, but not limited to, HCFC-124 (CAS No. 2837-89-0) and HCFC-124a (CAS No. 354-25-6).

Appendix 4 – Definition of Biomedical Waste

The following definition has been taken from the 1992 Canadian Council of Ministers of the Environment's *Guidelines for the Management of Biomedical Waste in Canada.*

Definition
This definition does not apply to microbiology laboratory waste, human blood and body fluid waste or waste sharps after these wastes have been disinfected or decontaminated.

Biomedical waste refers to waste that is generated by:

- human or animal health-care facilities
- medical or veterinary research and teaching establishments
- health care teaching establishments
- clinical testing or research laboratories, and
- facilities involved in the production or testing of vaccines.

The following are the types of biomedical waste:

a) Human Anatomical Waste

This consists of human tissues, organs and body parts, but does not include teeth, hair and nails.

b) Animal Waste

This consists of all animal tissues, organs, body parts, carcasses, bedding, fluid blood and blood products, items saturated or dripping with blood, body fluids contaminated with blood, and body fluids removed for diagnosis or removed during surgery, treatment or autopsy, unless a trained person has certified that the waste does not contain the viruses and agents listed in Risk Group 4 of the *Guidelines*. This excludes teeth, hair, nails, hooves and feathers.

c) Microbiology Laboratory Waste

This consists of laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human or animal cell cultures used in research, and laboratory material that has come into contact with any of these.

d) Human Blood and Body Fluid Waste

This consists of human fluid blood and blood products, items saturated or dripping with blood, body fluids contaminated with blood and body fluids removed for diagnosis during surgery, treatment or autopsy. This does not include urine or feces.

e) Waste Sharps

Waste sharps are clinical and laboratory materials consisting of needles, syringes, blades or laboratory glass capable of causing punctures or cuts.

Biomedical waste does not include waste that is:

- from animal husbandry
- household in origin
- controlled in accordance with the *Health of Animals Act* (Canada), formerly the *Animal Disease Protection Act* (Canada), or
- generated in the food production, general building maintenance and office administration activities of those facilities to which this definition applies.

Appendix 5 – Definition of Hazardous Waste

Cooperative efforts by federal and provincial environment departments and members of industry have led to the development of the following working definition of hazardous waste:

Hazardous wastes are those wastes that are potentially hazardous to human health and/or the environment due to their nature and quantity, and that require special handling techniques.

According to the *Export and Import of Hazardous Waste Regulations (EIHW)*, hazardous waste means a product, substance or organism that is intended for disposal or recycling, including storage prior to disposal or recycling, and that is:

(a) listed in Schedule III of the *EIHW Regulations*; or

(b) included in any of classes 2 to 6 and 8 and 9 of the *Transportation of Dangerous Goods Regulations*, except a product, substance or organism that is:

  (i) household in origin; or

  (ii) returned directly to its manufacturer or supplier for reprocessing, repackaging or resale,including a product, substance or organism that is:

    (A) defective or otherwise not usable for its original purpose; or

    (B) in surplus quantities but still usable for its original purpose.

More information on the *EIHW Regulations* can be found on the Web site <www.ec.gc.ca/CEPARegistry/regulations/>.

Information on the *TDG Regulations* can be found on the Web site <www.tc.gc.ca/acts-regulations/tdg/tdg1/part_1.htm>.

Appendix 6 – Examples of How to Estimate Releases

Examples of how to estimate releases for Part 1B, 2 and 3 substances are provided in Appendix 7.

Direct Measurement (Code M)

This estimation method is the most accurate. The example is based on measured concentrations of the substance in a waste stream and the volume/flow rate of that stream.

Example

A galvanizing facility discharges its wastewater to a nearby body of water. The electroplater is required to monitor this discharge once a month for various parameters, including release of total zinc. What is the annual release of total zinc to the wastewater by this galvanizer?

Step 1

Gather wastewater flow and concentration data from the monitoring results done in compliance with the municipal by-law for wastewater discharges. Analytical results for total zinc for the year are presented in the table below.

Step 2

Calculate the mass loading for those days on which a zinc analysis was performed. This is done by multiplying the daily flow by the measured zinc concentration.

CONCENTRATION OF ZINC IN WASTEWATER

DAY	WASTEWATER FLOW (10^6 L/d)	X	ZINC CONCENTRATION (µg/L)	=	RELEASES (kg/d)
Jan. 8	1.57		918		1.44
Feb. 12	1.49		700		1.04
Mar. 10	1.58		815		1.28
Apr. 15	1.66		683		1.13
May 9	1.38		787		1.09
June 13	1.29		840		1.08
July 11	1.73		865		1.50
Aug. 10	1.60		643		1.03
Sept. 8	1.75		958		1.68
Oct. 12	1.56		681		1.06
Nov. 10	1.80		680		1.22
Dec. 8	1.63		627		1.02
			Average		**1.21**

Step 3

Calculate annual releases.

Based on an average daily release of 1.21 kg over the year and 250 days of discharge during the year, the yearly total zinc discharged to water is:

1.21 kg/d x 250 d/yr = 304 kg/yr = 0.304 tonnes/yr (or 0.30 tonnes/yr after rounding)

Mass Balance Calculations (Code C)

A mass balance is an accounting of the quantity of a substance going in and out of an entire facility, process or piece of equipment. Releases can then be calculated as the difference between input and output. Accumulation or depletion of the substance in the equipment should be accounted for in the calculation.

Example

An electroplating facility operates a vapour degreaser.

Suppose that 14 tonnes of trichloroethylene are used as a degreasing agent. Spent solvent and sludge that accumulate on the bottom of the degreaser are collected in drums for shipment to an off-site solvent reclaimer. Thirteen drums of solvent were sent to the reclaimer during the past year.

A known volume of representative sample taken from the drums is weighed, allowed to evaporate, and reweighed. From this, it is determined that the density of the sludge is 1.03 kg/L and that the trichloroethylene concentration in the sludge shipped to the reclaimer is 30%.

Step 1

The entire 14 tonnes of solvent is released from the facility either as an air emission or as a transfer in the sludge. If the quantity of spent solvent shipped to the reclaimer is known, then the quantity transferred can be calculated based on the volume of sludge and the density of the sludge as shown below:

Volume of trichloroethylene to reclaimer
= 13 drums x 210 L/drum = 2 730 L

Mass of trichloroethylene to reclaimer:
= volume of sludge x density of sludge x % trichloroethylene in sludge
= 2 730 L x 1.03 kg/L x 0.30
= 844 kg
= 0.84 tonnes

Step 2

The quantity of trichloroethylene emitted to air can then be calculated by mass balance by subtracting the quantity shipped in sludge to the reclaimer from the quantity purchased:

14 tonnes (purchased) – 0.84 tonnes (to reclaimer) = 13.16 tonnes (or 13 tonnes after rounding)

Emission Factor (Code E)

An emission factor is based on average measured emissions from several similar processes. Emission factors usually express releases as a ratio of quantity released to process or equipment throughput.

Example

Suppose the electroplater previously mentioned has no information about the spent solvent and sludge accumulating on the bottom of the degreaser.

Step 1

In this case, the emission factor is found in a U.S. Environmental Protection Agency Publication entitled "Toxic Air Pollutant Emission Factors – A Compilation for Selected Air Toxic Compounds and Sources" (Bibliography no. 74). For an open-top vapour degreaser without emission control equipment using trichloroethylene (TCE), the emission factor is given as 0.93 tonne/tonne TCE used.

Step 2
Calculate the annual releases to air from the vapour degreaser as follows:

14 tonnes x 0.93 tonne/tonne = 13 tonnes (after rounding)
(TCE used x emission factor (TCE released/tonne used) = TCE released)

When emission control devices are used, atmospheric releases are estimated by multiplying the "uncontrolled" emission by the quantity (1 – C/100), where C is the control device efficiency.

Engineering Calculations (Code 0)

This estimation method is based on physical/chemical properties (e.g., vapour pressure) of the substance and mathematical relationships (e.g., ideal gas law).

Example
In this example, rinse water from a copper-plating unit is treated separately from other process wastewater. Sodium hydroxide is added to precipitate the copper (Cu) in the wastewater. The precipitate formed from this reaction is removed as sludge from the facility's central clarification unit. Purchasing and inventory records indicate that 0.9 tonnes of sodium hydroxide were used for precipitating copper last year. The quantity of copper precipitated represents the quantity of copper released from this source as solid waste.

Step 1
For each mole of copper (Cu) present in the rinse water, two moles of sodium hydroxide (NaOH) must be added to precipitate the copper according to the following reaction:

$$Cu^{++} + 2(NaOH) \rightarrow Cu(OH)_2 + 2Na^{+}$$

Scientific literature indicates that this reaction would be complete at a pH of 7.7. Sodium hydroxide is added until a pH of 8 is maintained in the reaction mixture to ensure complete precipitation. It is also known that:

Molecular Weight of Cu = 63.5 tonnes/tonne-mole
Molecular Weight of NaOH = 40 tonnes/tonne-mole

Step 2
Calculate the quantity of copper released in the wastewater treatment sludge, as follows:

- 2 NaOH react with 1 Cu
- 2 tonne-moles NaOH = 1 tonne-mole Cu
- $\frac{40 \text{ tonnes NaOH}}{\text{tonne-mole NaOH}} \times 2 \text{ tonne-moles NaOH} = 1 \text{ tonne-mole Cu} \times \frac{63.5 \text{ tonnes Cu}}{\text{tonne-mole Cu}}$
- 80 tonnes NaOH = 63.5 tonnes Cu
- $\frac{80 \text{ tonnes NaOH}}{0.9 \text{ tonne NaOH}} = \frac{63.5 \text{ tonnes Cu}}{A}$
- $A = \frac{0.9 \times 63.5 \text{ tonnes Cu}}{80}$
- A = 0.71 tonnes Cu

The estimation method is valid only if the NaOH reacts only with the Cu present in the wastewater.

Appendix 7 – Examples of Estimating Releases of Part 1B, 2 and 3 Substances

This appendix provides examples of various reporting scenarios for selected NPRI Part 1B, 2 and 3 substances. With the exception of wood-preservation processes, PAHs, dioxins/furans and HCB are typically by-products formed during certain manufacturing and combustion processes, and as such the quantities released as a result of incidental manufacture cannot be determined using engineering calculations or a mass balance. Instead, direct measurements or emission factors must be used. The U.S. EPA's Factor Information REtrieval (FIRE) database contains emission factors for many NPRI substances (see Appendix 12).

Example 1: Reporting for a Non-Hazardous Waste Incinerator Using Stack Testing Data

At this facility, 200 tonnes of non-hazardous waste were incinerated during the year, with a waste feed rate of 100 kg/hr. The facility has stack testing data for dioxins/furans. The measured stack gas concentration of dioxins/furans in air was 2.1 ng TEQ/m^3. The stack flow rate was 1.2 m^3/s. The facility produced 20 tonnes of incineration ash in the year and has measured an average dioxin/furan concentration of 1.52 mg TEQ/tonne of ash. The ash was shipped off site for disposal in a landfill.

Step 1. Determine if the facility must report to the NPRI for any alternate-threshold substances.
Reporting is required by facilities used for the "*non-hazardous waste incineration of 26 tonnes or more of waste per year*", regardless of the number of hours worked by employees. This facility incinerated 200 tonnes of biomedical waste, so a report is required for any substance that met the reporting criterion.

Step 2. Determine which substances and information must be reported.

Dioxins/furans

1. Determine if the measured concentration of dioxin/furan releases to air (2.1 ng TEQ/m^3) was greater than the LoQ of 32 pg TEQ/m^3.

$$Concentration = \left(\frac{2.1\ ng\ TEQ}{m^3}\right) \times \left(\frac{1000\ pg}{1\ ng}\right)$$

$$= 2100\ pg\ TEQ/m^3$$

This facility is required to report releases of dioxins/furans to air since the measured concentration of 2100 pg TEQ/m^3 was greater than the LoQ of 32 pg TEQ/m^3.

Calculate the hours of operation.

$$Hours\ of\ operation = \left(\frac{200\ tonnes\ waste}{yr}\right) \times \left(\frac{hr}{100\ kg\ waste}\right) \times \left(\frac{1000\ kg}{tonne}\right)$$

$$= 2000\ hours/yr$$

Calculate the quantity of dioxins/furans released to the air.

Q = *quantity of dioxins/furans released to air*
Q = (*measured concentration*) × (*flow rate*) × (*hours of operation/yr*)

$$= \left(\frac{2100\ pg\ TEQ}{m^3}\right) \times \left(\frac{1.2\ m^3}{s}\right) \times \left(\frac{2000\ hr}{yr}\right) \times \left(\frac{3600\ s}{hr}\right) \times \left(\frac{1\ g}{10^{12}\ pg}\right)$$

$$= 0.01814\ g\ TEQ/yr$$

The substance report for dioxin/furan releases to air would indicate: *Basis of Estimate Code* - Monitoring or direct measurement (Code M); *Detail Code* - At or above LoQ (Code AL); *Quantity* - 0.018 g TEQ. The quantity is rounded to the nearest thousandth (i.e., 0.018 g TEQ), since the smallest unit that the NPRI reporting software will accept for dioxins/furans is 0.001 g TEQ.

2. Determine if the measured concentration of dioxins/furans in the incineration ash (1.52 mg TEQ/tonne ash) was greater than the LoQ of 9 pg TEQ/g ash.

$$\textit{Concentration} = \left(\frac{1.52\ mg\ TEQ}{tonne\ ash}\right) \times \left(\frac{1\ g}{1000\ mg}\right) \times \left(\frac{10^{12}\ pg}{g}\right) \times \left(\frac{1\ tonne}{10^{6}\ g}\right)$$

$$= 1520\ pg\ TEQ/g\ ash$$

The measured concentration of 1520 pg TEQ/g ash was greater than the LoQ for dioxins/furans in ash of 9 pg TEQ/g ash, therefore the quantity of dioxins/furans in ash transferred off site for disposal must be reported.

3. Calculate the quantity of dioxins/furans contained in the incineration ash that was transferred off site for disposal.

$$\textit{Quantity of dioxins/furans transferred off site} = (\textit{ash produced}) \times (\textit{concentration of dioxins/furans in ash})$$

$$= \left(\frac{20\ tonnes\ of\ ash}{yr}\right) \times \left(\frac{1.52\ mg\ TEQ}{tonnes\ of\ ash}\right) \times \left(\frac{1\ g}{1000\ mg}\right)$$

$$= 0.0304\ g\ TEQ/yr$$

The substance report for dioxin/furan transfers off site would indicate: *Basis of Estimate Code* - Monitoring or direct measurement (Code M); *Detail Code* - At or above LoQ (Code AL); *Quantity* - 0.030 g TEQ. The quantity is rounded to the nearest thousandth (i.e., 0.030 g TEQ), since the smallest unit that the NPRI reporting software will accept for dioxins/furans is 0.001 g TEQ.

4. Based on process operations, it is known that there were no on-site releases of dioxins/furans to land, water or underground injection resulting from the incineration process. The substance report for dioxin/furan releases to land, water and underground injection would indicate: *Basis of Estimate Code* - Not applicable (Code NA); *Detail Code* - not applicable; *Quantity* - not applicable.

HCB

1. There were no direct measurements performed for HCB at this facility. Use the emission factors provided in the FIRE database to estimate the HCB releases to air.

$$\textit{Quantity released to air} = \left(\frac{0.029\ g\ HCB}{tonne\ of\ waste\ incinerated}\right) \times \left(\frac{200\ tonnes\ waste\ incinerated}{yr}\right)$$

$$= 5.8\ g\ HCB$$

The substance report for HCB releases to air would indicate: *Basis of Estimate Code* - Emission factors (Code E); *Detail Code* - not applicable; *Quantity* - 5.8 g.

2. There was no information available on the concentration of HCB in incineration ash transferred off site for disposal. The substance report for HCB transferred off site for disposal would indicate: *Basis of Estimate Code* - No information available (Code NI); *Detail Code* - not applicable; *Quantity* - not applicable.

3. Based on unit operations, it is known that there were no on-site releases of HCB to land, water or underground injection resulting from the incineration process. The substance report for HCB releases to land, water and underground injection would indicate: *Basis of Estimate Code* - Not applicable (Code NA); *Detail Code* - not applicable; *Quantity* - not applicable.

Example 2: Reporting for a Cement Kiln

A facility operated a cement kiln and employed 25 full-time employees. Process throughput amounted to 2 500 000 tonnes of clinker produced during the year. The facility incidentally processed and released 9.4 kg of mercury to air from trace mercury contamination in the limestone processed in the kiln and from fossil fuels combusted. The concentration of dioxins/furans released to air was measured at 0.051 ng TEQ/m^3, and the total quantity of dioxins/furans released to air from the stack was calculated to be 0.025 g TEQ. The average concentration of HCB released to air over the year was measured at 30.0 ng/m^3, and the total quantity of HCB released to air from the stack was calculated to be 9 g.

Step 1. Determine if the facility must report to the NPRI.
The facility met the 20 000-hour employee threshold and, as such, is required to report to the NPRI for substances which met the NPRI reporting criteria.

Step 2. Determine which substances and information must be reported.

Mercury (and its compounds)
The facility incidentally processed and released 9.4 kg of mercury to air. This quantity exceeded the 5-kg manufacture, process or other-use threshold for mercury, so the facility must report for mercury (and its compounds).

PAHs
1. Determine if the facility met the NPRI reporting criteria for PAHs. PAHs are reported if the facility incidentally manufactured these substances and the quantity of the PAHs released on site or transferred off site totalled 50 kg or more.

2. In this example, the facility uses the emission factors provided in the FIRE database, to calculate the quantities of the *individual* PAHs that were incidentally manufactured and released or transferred. The quantity of each individual PAH released is added to determine whether the total of the PAHs listed in Part 2 of the 2002 *Canada Gazette* notice met or exceeded the 50-kg threshold for total PAHs incidentally manufactured and released or transferred. For a throughput of 2 500 000 tonnes of clinker, the following quantities of individual PAHs are released to air.

INDIVIDUAL PAHs IN PART 2, FOR WHICH THERE IS AN EMISSION FACTOR	EMISSION FACTOR (mg PAHs/tonne CLINKER PRODUCED)	QUANTITY (mg)	(kg)
Fluoranthene	2.42	6 050 000	6.05
Phenanthrene	16.9	42 250 000	42.25
Pyrene	1.46	3 650 000	3.65
		Total	51.95 kg

The quantity of the individual PAHs resulting from incidental manufacture totalled more than 50 kg, so the facility has met the reporting threshold for PAHs, and must report these substances.

3. The facility must submit a substance report to the NPRI for *each* of the three PAH substances for which there are data. The substance reports and quantity reported for on-site releases to air are: 6.05 kg of fluoranthene, 42.25 kg of phenanthrene and 3.65 kg of pyrene. No report is required for the individual PAHs for which there are no emission factors (i.e., benzo(a)anthracene, benzo(a)phenanthrene, etc.). The releases **are not** reported under the listing "PAHs, total Part 2" because the facility has information for some of the individual Part 2 PAHs.

4. There were no releases to water, land or underground injection of any incidentally manufactured PAHs, so the facility reports no releases to these media.

5. There is no knowledge of the quantity of incidentally manufactured PAHs in the residue from the pollution control devices (e.g., electrostatic precipitator), so the facility reports no transfers of the three PAHs.

Note: "PAHs, total Part 2" may only be reported if no information is available for the individual Part 2 PAH substances. Such would be the case if the only emission factor available is for a group of PAH substances or if a monitoring or direct measurement only determined the quantity of a group of PAHs without any data for the individual PAH substances.

Dioxins/furans

1. A direct measurement was used to determine the quantity of dioxins/furans released to air. Compare the measured concentration value to the LoQ for air. The LoQ for releases to air is 32 pg TEQ/m^3.

$$\textit{Concentration measured} = \left(\frac{0.051\ ng\ TEQ\ dioxins/furans}{m^3\ air}\right) \times \left(\frac{10^3\ pg}{ng}\right)$$

$$= 51.0\ pg\ TEQ/m^3$$

The concentration of 51 pg TEQ/m^3 was above the LoQ for dioxins/furans for air of 32 pg TEQ/m^3, therefore the facility *is* required to report the quantity of dioxins/furans released. The substance report for dioxins/furans released to air would indicate: *Basis of Estimate Code* - Monitoring or direct measurement (Code M); *Detail Code* – At or above LoQ (Code AL); *Quantity* - 0.025 g TEQ.

There were no releases of dioxins/furans to water, land or underground injection, nor any transfers off site for disposal. The substance report for dioxin/furan releases to land, water and underground injection would indicate: *Basis of Estimate Code* - Not applicable (Code NA); *Detail Code* - not applicable; *Quantity* - not applicable.

HCB

1. Direct measurement was used to determine releases to air. Compare the measured concentration value to the LoQ for air. The measured concentration of 30 ng/m^3 was larger than the LoQ for HCB for air of 6 ng/m^3, so the facility is required to report the quantity released. The substance report for HCB released to air would indicate: *Basis of Estimate Code* - Monitoring or direct measurement (Code M); *Detail Code* - At or above LoQ (Code AL); *Quantity* - 9 g.

2. There were no on-site releases of HCB to water, land or underground injection, nor any transfers off site, so the facility reports no releases to these media or transfers. The substance report for HCB releases to land, water and underground injection would indicate: *Basis of Estimate Code* - Not applicable (Code NA); *Detail Code* - not applicable; *Quantity* - not applicable.

Example 3: Using the Manufacture, Process or Other-Use Threshold for Reporting Mercury (and its compounds)

The following example illustrates the calculation of the 5-kg manufacture, process or other-use reporting threshold applicable to mercury (and its compounds). This facility used several processes in which mercury (and its compounds) were manufactured, processed or otherwise used. There is no 1% concentration exemption for mercury (and its compounds). Mercury (and its compounds), at any concentration, must be considered when calculating the reporting threshold and reporting mercury releases.

The facility met the 20 000-hour employee threshold and the processes used were:
1. In the first process, mercury was present in a mixture at a 1% concentration.
2. The facility received a raw material which contained 0.005% mercury, which was processed in stream 2.
3. In process stream 3, mercury was present at a concentration of 0.01%.

MATERIAL CONTAINING MERCURY	TOTAL WEIGHT OF MATERIAL CONTAINING MERCURY (tonnes)	CONCENTRATION OF MERCURY IN THE MATERIAL	NET WEIGHT OF MERCURY (tonnes)
Process stream 1	1	1.0%	0.01
Process stream 2 (raw material)	50	0.005%	0.0025
Process stream 3	20	0.01%	0.02
		Total weight of mercury	0.0325 tonnes (32.5 kg)

In this example, the facility would be required to submit a report to the NPRI for mercury (and its compounds) because the total quantity manufactured, processed or otherwise used at the facility exceeded the 5-kg reporting threshold. The facility must report the quantity released on site and transferred off site.

Appendix 8 – Four-digit North American Industry Classification System (NAICS) Codes

11	**Agriculture, Forestry, Fishing & Hunting**
111	Crop Production
1111	Oilseed & Grain Farming
1112	Vegetable & Melon Farming
1113	Fruit & Tree Nut Farming
1114	Greenhouse, Nursery & Floriculture Production
1119	Other Crop Farming
112	Animal Production
1121	Cattle Ranching & Farming
1122	Hog & Pig Farming
1123	Poultry & Egg Production
1124	Sheep & Goat Farming
1125	Animal Aquaculture
1129	Other Animal Production
113	Forestry & Logging
1131	Timber Tract Operations
1132	Forest Nurseries & Gathering Forest Products
1133	Logging
114	Fishing, Hunting & Trapping
1141	Fishing
1142	Hunting & Trapping
115	Support Activities for Agriculture & Forestry
1151	Support Activities for Crop Production
1152	Support Activities for Animal Production
1153	Support Activities for Forestry
21	**Mining & Oil & Gas Extraction**
211	Oil & Gas Extraction
2111	Oil & Gas Extraction
212	Mining (exc. Oil & Gas)
2121	Coal Mining
2122	Metal Ore Mining
2123	Non-Metallic Mineral Mining & Quarrying
213	Support Act.- Mining & Oil & Gas Extraction
2131	Support Act.- Mining & Oil & Gas Extraction
22	**Utilities**
221	Utilities
2211	Electricity Generation, Transmission & Dist.
2212	Natural Gas Distribution
2213	Water, Sewage & Other Systems
23	**Construction**
231	Prime Contracting
2311	Land Subdivision & Land Development
2312	Building Construction
2313	Engineering Construction
2314	Construction Management
232	Trade Contracting
2321	Site Preparation Work
2322	Building Structure Work
2323	Building Exterior Finishing Work
2324	Building Interior Finishing Work
2325	Building Equipment Installation
2329	Other Special Trade Contracting
31-33	**Manufacturing**
311	Food Mfg.
3111	Animal Food Mfg.
3112	Grain & Oilseed Milling
3113	Sugar & Confectionery Product Mfg.
3114	Fruit & Veg. Preserving & Specialty Food Mfg.
3115	Dairy Product Mfg.
3116	Meat Product Mfg.
3117	Seafood Product Preparation & Packaging
3118	Bakeries & Tortilla Mfg.
3119	Other Food Mfg.
312	Beverage & Tobacco Product Mfg.
3121	Beverage Mfg.
3122	Tobacco Mfg.
313	Textile Mills
3131	Fibre, Yarn & Thread Mills
3132	Fabric Mills
3133	Textile & Fabric Finishing & Fabric Coating
314	Textile Product Mills
3141	Textile Furnishings Mills
3149	Other Textile Product Mills
315	Clothing Mfg.
3151	Clothing Knitting Mills
3152	Cut & Sew Clothing Mfg.
3159	Clothing Accessories & Other Clothing Mfg.
316	Leather & Allied Product Mfg.
3161	Leather & Hide Tanning & Finishing
3162	Footwear Mfg.
3169	Other Leather & Allied Product Mfg.
321	Wood Product Mfg.
3211	Sawmills & Wood Preservation
3212	Veneer, Plywood & Eng'rd Wood Product Mfg.
3219	Other Wood Product Mfg.
322	Paper Mfg.
3221	Pulp, Paper & Paperboard Mills
3222	Converted Paper Product Mfg.
323	Printing & Related Support Activities
3231	Printing & Related Support Activities
324	Petroleum & Coal Products Mfg.
3241	Petroleum & Coal Products Mfg.
325	Chemical Mfg.
3251	Basic Chemical Mfg.
3252	Resin, Synth. Rubber, & Fibre & Filament Mfg.
3253	Pesticide, Fertilizer & Other Agr. Chem. Mfg.
3254	Pharmaceutical & Medicine Mfg.
3255	Paint, Coating & Adhesive Mfg.
3256	Soap, Cleaning Compound & Toilet Prep. Mfg.
3259	Other Chemical Product Mfg.
326	Plastics & Rubber Products Mfg.
3261	Plastic Product Mfg.

3262	Rubber Product Mfg.
327	Non-Metallic Mineral Product Mfg.
3271	Clay Product & Refractory Mfg.
3272	Glass & Glass Product Mfg.
3273	Cement & Concrete Product Mfg.
3274	Lime & Gypsum Product Mfg.
3279	Other Non-Metallic Mineral Product Mfg.
331	Primary Metal Mfg.
3311	Iron & Steel Mills & Ferro-Alloy Mfg.
3312	Steel Product Mfg. from Purchased Steel
3313	Alumina & Aluminum Production & Processing
3314	Non-Ferrous (exc. Al) Production & Processing
3315	Foundries
332	Fabricated Metal Product Mfg.
3321	Forging & Stamping
3322	Cutlery & Hand Tool Mfg.
3323	Architectural & Structural Metals Mfg.
3324	Boiler, Tank & Shipping Container Mfg.
3325	Hardware Mfg.
3326	Spring & Wire Product Mfg.
3327	Machine Shops, Turned Product & Related Mfg.
3328	Coating, Engraving & Heat Treating Activities
3329	Other Fabricated Metal Product Mfg.
333	Machinery Mfg.
3331	Agr., Construction & Mining Machinery Mfg.
3332	Industrial Machinery Mfg.
3333	Commercial & Service Industry Machinery Mfg.
3334	Ventilation, Heating, AC & Refrig. Equip. Mfg
3335	Metalworking Machinery Mfg.
3336	Engine, Turbine & Power Transmission Mfg.
3339	Other General-Purpose Machinery Mfg.
334	Computer & Electronic Product Mfg.
3341	Computer & Peripheral Equipment Mfg.
3342	Communications Equipment Mfg.
3343	Audio & Video Equipment Mfg.
3344	Semiconductor & Electronic Component Mfg.
3345	Instruments Mfg.
3346	Mfg. & Reproducing Magnetic & Optical Media
335	Electric Equip., Appliance & Component Mfg.
3351	Electric Lighting Equipment Mfg.
3352	Household Appliance Mfg.
3353	Electrical Equipment Mfg.
3359	Other Electrical Equipment & Component Mfg.
336	Transportation Equipment Mfg.
3361	Motor Vehicle Mfg.
3362	Motor Vehicle Body & Trailer Mfg.
3363	Motor Vehicle Parts Mfg.
3364	Aerospace Product & Parts Mfg.
3365	Railroad Rolling Stock Mfg.
3366	Ship & Boat Building
3369	Other Transportation Equipment Mfg.
337	Furniture & Related Product Mfg.
3371	Household & Inst. Furniture & Cabinet Mfg.
3372	Office Furniture (including Fixtures) Mfg.
3379	Other Furniture-Related Product Mfg.
339	Miscellaneous Mfg.
3391	Medical Equipment & Supplies Mfg.
3399	Other Miscellaneous Mfg.

41	**Wholesale Trade**
411	Farm Product Whl.
4111	Farm Product Whl.
412	Petroleum Product Whl.
4121	Petroleum Product Whl.
413	Food, Beverage & Tobacco Whl.
4131	Food Whl.
4132	Beverage Whl.
4133	Cigarette & Tobacco Product Whl.
414	Personal & Household Goods Whl.
4141	Textile, Clothing & Footwear Whl.
4142	Home Ent. Equip & Hhld. Appliance Whl.
4143	Home Furnishings Whl.
4144	Personal Goods Whl.
4145	Pharmaceuticals, Toiletries & Related Whl.
415	Motor Vehicle & Parts Whl.
4151	Motor Vehicle Whl.
4152	New Motor Vehicle Parts & Accessories Whl.
4153	Used Motor Vehicle Parts & Accessories Whl.
416	Building Material & Supplies Whl.
4161	Electrical, Plumbing, Heating & AC Equip. Whl
4162	Metal Service Centres
4163	Lumber & Other Building Supplies Whl.
417	Machinery, Equipment & Supplies Whl.
4171	Farm, Lawn & Garden Machinery & Equip. Whl.
4172	Construction, Forestry & Ind'l Machinery Whl.
4173	Computer & Communications Equipment Whl.
4179	Other Machinery, Equipment & Supplies Whl.
418	Miscellaneous Wholesaler-Distributors
4181	Recyclable Material Whl.
4182	Paper & Disposable Plastic Product Whl.
4183	Agricultural Supplies Whl.
4184	Chemical (exc. Agr.) & Allied Product Whl.
4189	Other Misc. Whl.
419	Wholesale Agents & Brokers
4191	Wholesale Agents & Brokers
44-45	**Retail Trade**
441	Motor Vehicle and Parts Dealers
4411	Automobile Dealers
4412	Other Motor Vehicle Dealers
4413	Automotive Parts, Accessories & Tire Stores
442	Furniture & Home Furnishings Stores
4421	Furniture Stores
4422	Home Furnishings Stores
443	Electronics & Appliance Stores
4431	Electronics & Appliance Stores
444	Building Material & Garden Equipment Dealers
4441	Building Material & Supplies Dealers
4442	Lawn & Garden Equipment & Supplies Stores
445	Food & Beverage Stores
4451	Grocery Stores
4452	Specialty Food Stores
4453	Beer, Wine & Liquor Stores
446	Health & Personal Care Stores
4461	Health & Personal Care Stores
447	Gasoline Stations
4471	Gasoline Stations
448	Clothing & Clothing Accessories Stores
4481	Clothing Stores
4482	Shoe Stores

4483	Jewellery, Luggage & Leather Goods Stores
451	Sporting Goods, Hobby, Book & Music Stores
4511	Sport, Hobby & Musical Instrument Stores
4512	Book, Periodical & Music Stores
452	General Merchandise Stores
4521	Department Stores
4529	Other General Merchandise Stores
453	Misc. Store Retailers
4531	Florists
4532	Office Supply, Stationery & Gift Stores
4533	Used Merchandise Stores
4539	Other Misc. Store Retailers
454	Non-Store Retailers
4541	Electronic Shopping & Mail-Order Houses
4542	Vending Machine Operators
4543	Direct Selling Establishments
48-49	**Transportation & Warehousing**
481	Air Transportation
4811	Scheduled Air Transportation
4812	Non-Scheduled Air Transportation
482	Rail Transportation
4821	Rail Transportation
483	Water Transportation
4831	Deep Water Transportation
4832	Inland Water Transportation
484	Truck Transportation
4841	General Freight Trucking
4842	Specialized Freight Trucking
485	Transit & Ground Passenger Transportation
4851	Urban Transit Systems
4852	Interurban & Rural Bus Transportation
4853	Taxi & Limousine Service
4854	School & Employee Bus Transportation
4855	Charter Bus Industry
4859	Other Transit & Ground Passenger Transport
486	Pipeline Transportation
4861	Pipeline Transportation of Crude Oil
4862	Pipeline Transportation of Natural Gas
4869	Other Pipeline Transportation
487	Scenic & Sightseeing Transportation
4871	Scenic & Sightseeing Transportation, Land
4872	Scenic & Sightseeing Transportation, Water
4879	Scenic & Sightseeing Transportation, Other
488	Support Activities for Transportation
4881	Support Activities for Air Transportation
4882	Support Activities for Rail Transportation
4883	Support Activities for Water Transportation
4884	Support Activities for Road Transportation
4885	Freight Transportation Arrangement
4889	Other Support Activities for Transportation
491	Postal Service
4911	Postal Service
492	Couriers & Messengers
4921	Couriers
4922	Local Messengers & Local Delivery
493	Warehousing & Storage
4931	Warehousing & Storage

51	**Information & Cultural Industries**
511	Publishing Industries
5111	Newspaper, Periodical, Book & DB Publishers
5112	Software Publishers
512	Motion Picture & Sound Recording Industries
5121	Motion Picture & Video Industries
5122	Sound Recording Industries
513	Broadcasting & Telecommunications
5131	Radio & Television Broadcasting
5132	Pay TV, Specialty TV & Program Distribution
5133	Telecommunications
514	Information & Data Processing Services
5141	Information Services
5142	Data Processing Services
52	**Finance & Insurance**
521	Monetary Authorities - Central Bank
5211	Monetary Authorities - Central Bank
522	Credit Intermediation & Related Activities
5221	Depository Credit Intermediation
5222	Non-Depository Credit Intermediation
5223	Activities Related to Credit Intermediation
523	Securities, Commodity Contracts & Related
5231	Securities & Commodity Contracts Intermed.
5232	Securities & Commodity Exchanges
5239	Other Financial Investment Activities
524	Insurance Carriers & Related Activities
5241	Insurance Carriers
5242	Agencies, Brokerages & Other Insurance Act.
526	Funds and Other Financial Vehicles
5261	Pension Funds
5269	Other Funds and Financial Vehicles
53	**Real Estate & Rental & Leasing**
531	Real Estate
5311	Lessors of Real Estate
5312	Offices of Real Estate Agents & Brokers
5313	Activities Related to Real Estate
532	Rental & Leasing Services
5321	Automotive Equipment Rental & Leasing
5322	Consumer Goods Rental
5323	General Rental Centres
5324	Commercial & Ind'l Machinery Rental & Leasing
533	Lessors of Non-Financial Intangible Assets
5331	Lessors of Non-Financial Intangible Assets
54	**Professional, Scientific & Technical Services**
541	Professional, Scientific & Technical Services
5411	Legal Services
5412	Accounting, Tax Prep. & Bookkeeping Services
5413	Architectural, Engineering & Related Services
5414	Specialized Design Services
5415	Computer Systems Design & Related Services
5416	Mgmt., Scientific & Technical Consulting Serv.
5417	Scientific R&D Services
5418	Advertising & Related Services
5419	Other Prof., Scientific & Technical Services

55	**Management of Companies & Enterprises**
551	Management of Companies & Enterprises
5511	Management of Companies & Enterprises
56	**Admin., Support, Waste Mgmt & Remed. Services**
561	Administrative & Support Services
5611	Office Administrative Services
5612	Facilities Support Services
5613	Employment Services
5614	Business Support Services
5615	Travel Arrangement & Reservation Services
5616	Investigation & Security Services
5617	Services to Buildings & Dwellings
5619	Other Support Services
562	Waste Management & Remediation Services
5621	Waste Collection
5622	Waste Treatment & Disposal
5629	Remediation & Other Waste Mgmt. Services
61	**Educational Services**
611	Educational Services
6111	Elementary & Secondary Schools
6112	Community Colleges & C.E.G.E.P.s
6113	Universities
6114	Business Schools & Computer & Mgmt. Training
6115	Technical & Trade Schools
6116	Other Schools & Instruction
6117	Educational Support Services
62	**Health Care & Social Assistance**
621	Ambulatory Health Care Services
6211	Offices of Physicians
6212	Offices of Dentists
6213	Offices of Other Health Practitioners
6214	Out-Patient Care Centres
6215	Medical & Diagnostic Laboratories
6216	Home Health Care Services
6219	Other Ambulatory Health Care Services
622	Hospitals
6221	General Medical & Surgical Hospitals
6222	Psychiatric & Substance Abuse Hospitals
6223	Specialty (exc. Psych., etc.) Hospitals
623	Nursing & Residential Care Facilities
6231	Nursing Care Facilities
6232	Res. Developmental Handicap, etc., Facilities
6233	Community Care Facilities for the Elderly
6239	Other Residential Care Facilities
624	Social Assistance
6241	Individual & Family Services
6242	Community Food & Housing & Emerg., etc. Serv.
6243	Vocational Rehabilitation Services
6244	Child Day-Care Services
71	**Arts, Entertainment & Recreation**
711	Performing Arts, Spectator Sports & Related
7111	Performing Arts Companies
7112	Spectator Sports
7113	Promoters of Performing Arts, Sports, etc.
7114	Agents & Managers for Public Figures
7115	Independent Artists, Writers & Performers
712	Heritage Institutions
7121	Heritage Institutions
713	Amusement, Gambling & Recreation Industries
7131	Amusement Parks & Arcades
7132	Gambling Industries
7139	Other Amusement & Recreation Industries
72	**Accommodation & Food Services**
721	Accommodation Services
7211	Traveller Accommodation
7212	RV Parks & Recreational Camps
7213	Rooming & Boarding Houses
722	Food Services & Drinking Places
7221	Full-Service Restaurants
7222	Limited-Service Eating Places
7223	Special Food Services
7224	Drinking Places (Alcoholic Beverages)
81	**Other Services (exc. Public Administration)**
811	Repair and Maintenance
8111	Automotive R&M
8112	Electronic & Precision Equipment R&M
8113	Commercial & Ind'l Mach. & Equip. R&M
8114	Personal & Household Goods R&M
812	Personal & Laundry Services
8121	Personal Care Services
8122	Funeral Services
8123	Dry Cleaning and Laundry Services
8129	Other Personal Services
813	Religious, Grant-Making, Civic & Similar Orgs.
8131	Religious Organizations
8132	Grant-Making & Giving Services
8133	Social Advocacy Organizations
8134	Civic & Social Organizations
8139	Business, Prof., Labour & Other Member. Orgs.
814	Private Households
8141	Private Households
91	**Public Administration**
911	Federal Government Public Administration
9111	Defence Services
9112	Federal Protective Services
9113	Federal Labour, Employment & Immigration Serv.
9114	Foreign Affairs & International Assistance
9119	Other Fed. Government Public Administration
912	Prov. & Territorial Public Administration
9121	Provincial Protective Services
9122	Provincial Labour & Employment Services
9129	Other Prov. & Terr. Public Administration
913	Municipal Public Administration
9131	Municipal Protective Services
9139	Other Municipal Public Administration
914	Aboriginal Public Administration
9141	Aboriginal Public Administration
919	Extra-Territorial Public Administration
9191	Extra-Territorial Public Administration

Appendix 9 – Two-digit 1980 Canadian Standard Industrial Classification (SIC) Codes

01	Agricultural Industries
02	Service Industries Incidental to Agriculture
03	Fishing and Trapping Industries
04	Logging Industry
05	Forest Services Industry
06	Mining Industries
07	Crude Petroleum and Natural Gas Industries
08	Quarry and Sand Pit Industries
09	Service Industries Incidental to Mineral Extraction
10	Food Industries
11	Beverage Industries
12	Tobacco Products Industries
15	Rubber Products Industries
16	Plastic Products Industries
17	Leather and Allied Products Industries
18	Primary Textile Industries
19	Textile Products Industries
24	Clothing Industries
25	Wood Industries
26	Furniture and Fixture Industries
27	Paper and Allied Products Industries
28	Printing, Publishing and Allied Industries
29	Primary Metal Industries
30	Fabricated Metal Products Industries (except Machinery and Transportation Equipment Industries)
31	Machinery Industries (except Electrical Machinery)
32	Transportation Equipment Industries
33	Electrical and Electronic Products Industries
35	Non-metallic Mineral Products Industries
36	Refined Petroleum and Coal Products Industries
37	Chemical and Chemical Products Industries
39	Other Manufacturing Industries
40	Building Developing and General Contracting Industries
41	Industrial and Heavy (Engineering) Construction Industries
42	Trade Contracting Industries
44	Service Industries Incidental to Construction
45	Transportation Industries
46	Pipeline Transport Industries
47	Storage and Warehousing Industries
48	Communication Industries
49	Other Utility Industries
50	Farm Products Industries, Wholesale
51	Petroleum Products Industries, Wholesale
52	Food, Beverage, Drug and Tobacco Industries, Wholesale
53	Apparel and Dry Goods Industries, Wholesale
54	Household Goods Industries, Wholesale
55	Motor Vehicle, Parts and Accessories Industries, Wholesale
56	Metals, Hardware, Plumbing, Heating and Building Materials Industries, Wholesale
57	Machinery, Equipment and Supplies, Wholesale
59	Other Products and Industries, Wholesale
60	Food, Beverage and Drug Industries, Retail
61	Shoe, Apparel, Fabric and Yarn Industries, Retail
62	Household Furniture, Appliances and Furnishings Industries, Retail
63	Automotive Vehicles, Parts and Accessories, Sales and Service
64	General Retail Merchandising Industries
65	Other Retail Store Industries
69	Non-store Retail Industries
70	Deposit-accepting Intermediary Industries
71	Consumer and Business Financing Intermediary Industries
72	Investment Intermediary Industries
73	Insurance Industries
74	Other Financial Intermediary Industries
75	Real Estate Operating Industries (except Developers)
76	Insurance and Real Estate Agent Industries
77	Business Service Industries
81	Federal Government Service Industries
82	Provincial and Territorial Government Service Industries
83	Local Government Service Industries
84	International and Extra-territorial Government Service Industries
85	Educational Service Industries
86	Health and Social Service Industries
91	Accommodation Service Industries
92	Food and Beverage Industries
96	Amusement and Recreational Service Industries
97	Personal and Household Service Industries
98	Membership Organization Industries
99	Other Service Industries

Appendix 10 – Two-digit 1987 U.S. Standard Industrial Classification (SIC) Codes

01	Agricultural Production Crops
02	Agricultural Production Livestock
07	Agricultural Services
08	Forestry
09	Fishing, Hunting and Trapping
10	Metal Mining
12	Coal Mining
13	Oil and Gas Extraction
14	Non-metallic Minerals, except Fuels
15	General Building Contractors
16	Heavy Construction, except Building
17	Special Trade Contractors
20	Food and Kindred Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel and Other Textile Products
24	Lumber and Wood Products
25	Furniture and Fixtures
26	Paper and Allied Products
27	Printing and Publishing
28	Chemicals and Allied Products
29	Petroleum and Coal Products
30	Rubber and Miscellaneous Plastics Products
31	Leather and Leather Products
32	Stone, Clay, and Glass Products
33	Primary Metal Industries
34	Fabricated Metal Products
35	Industrial Machinery and Equipment
36	Electronic and Other Electric Equipment
37	Transportation Equipment
38	Instruments and Related Products
39	Miscellaneous Manufacturing Industries
40	Railroad Transportation
41	Local and Interurban Passenger Transit
42	Trucking and Warehousing
43	U.S. Postal Service
44	Water Transportation
45	Transportation by Air
46	Pipelines, except Natural Gas
47	Transportation Services
48	Communications
49	Electric, Gas, and Sanitary Services
50	Wholesale Trade Durable Goods
51	Wholesale Trade Non-durable Goods
52	Building Materials and Garden Supplies
53	General Merchandise Stores
54	Food Stores
55	Automotive Dealers and Service Stations
56	Apparel and Accessory Stores
57	Furniture and Home Furnishings Stores
58	Eating and Drinking Places
59	Miscellaneous Retail
60	Depository Institutions
61	Non-depository Institutions
62	Security and Commodity Brokers
63	Insurance Carriers
64	Insurance Agents, Brokers, and Service
65	Real Estate
67	Holding and Other Investment Offices
70	Hotels and Other Lodging Places
72	Personal Services
73	Business Services
75	Auto Repair, Services and Parking
76	Miscellaneous Repair Services
78	Motion Pictures
79	Amusement and Recreation Services
80	Health Services
81	Legal Services
82	Educational Services
83	Social Services
84	Museums, Botanical, Zoological Gardens
86	Membership Organizations
87	Engineering and Management Services
88	Private Households
89	Services, n.e.c.
91	Executive, Legislative and General
92	Justice, Public Order and Safety
93	Finance, Taxation and Monetary Policy
94	Administration of Human Resources
95	Environmental Quality and Housing
96	Administration of Economic Programs
97	National Security and International Affairs

Appendix 11 – Reported Mercury Content of Various Products and Materials

The following table provides information on the mercury content of various products and materials. The table serves as a quick reference for sources of mercury. However, where possible, facilities should confirm with their suppliers the quantity of mercury contained in various products or materials. If only a range of concentrations is available for a substance present in a mixture, use the average of the range for threshold determinations. If no other information is available, use the information provided in this table to estimate the mercury content of the product or material. An item retains its article status if it is a manufactured item that does not release mercury under normal conditions of processing or other use. References are cited beneath this table.

	MERCURY CONTENT				
PRODUCT/MATERIAL TYPE	MEAN	RANGE	UNITS	COMMENTS	REFERENCE
Chemical/Preservative Materials					
Catalyst				Unknown current use of mercuric chloride catalyst for producing vinyl chloride monomer and phenyl-mercuric compound catalysts for producing polyurethane foams. Methyl mercury hydroxide has been used as an epoxidation catalyst and ethyl mercury chloride used as a polymerization catalyst.	U.S. EPA 1994, U.S. EPA 1997, U.S. NTP 2000
Caustic Soda Solution (50%)		< 0.25	ppm	Mercury is present as an impurity in a concentration of less than 0.25 ppm in the caustic soda solution (50%). In the chlorine-alkali process for industrial fabrication of caustic soda and gaseous chlorine, mercury is used in direct contact with the solution as a cathode, which explains the presence of mercury as an impurity in the caustic soda.	Environment Canada, personal communication
Explosive Detonator				Mercury fulminate was widely used as a detonator for explosives with unknown current use.	Spectrum 2000
Miscellaneous				Mercuric chloride has been used as an agent for browning and etching steel and iron, intensifier in photography, electroplating aluminum, photocopy toners.	U.S. NTP 2000, Scorecard 2000
Paint Preservative				Mercury compounds were previously, but no longer, used as an interior and exterior paint preservative (e.g., phenylmercuric acetate, N-phenylmercury 2-ethylhexyl maleate, phenylmercuric oleate, etc.).	Poll. Probe 1996, U.S. EPA 1997
Pesticide				Various mercury compounds have been used as bactericides and fungicides (e.g., methyl mercury(II) chloride, methyl mercury hydroxide, ethylmercury chloride, phenylmercuric acetate, phenylmercuric nitrate, mercuric chloride, mercury (o-carboxyphenyl)thio) ethyl sodium salt). Registration of all material fungicides was discontinued in December 1995.	U.S. NTP 2000, Env. Can. 1998

PRODUCT/MATERIAL TYPE	MERCURY CONTENT MEAN	RANGE	UNITS	COMMENTS	REFERENCE
Pigment/Colouring Agent				Although mostly phased out, mercury (cadmium mercury sulphides) has been used to produce dark red pigments for inks, dyes and impregnation to plastic and rubber products.	Poll. Probe 1996, Env. Can. 1998
Preservative				Mercuric chloride has been used as a preservative for materials such as wood, leather tanning, white reserve in fabric printing and embalming anatomical specimens.	U.S. NTP 2000
Sulphuric Acid				Sulphuric acid is known to contain mercury. Refer to the MSDS to determine the mercury content.	
Electrical Equipment/Instruments					
Batteries					
- Alkaline	~ 0.1		g/unit	0.025% unit mass, type AAA – 9V dry cell	Env. Can. 1998, U.S. EPA 1998
- Alkaline (no mercury design)				type AAA – 9V dry cell	Env. Can. 1998
- Mercuric Oxide	1.35		g/unit	33.3% unit mass, button cell	Env. Can. 1998
- Silver Oxide	0.008		g/unit	0.6% unit mass, button cell	Env. Can. 1998
- Zinc Air	0.009		g/unit	1.0% unit mass, button cell	Env. Can. 1998, U.S. EPA 1998
- Zinc Carbon				1% unit mass, type AAA – 9V dry cell	U.S. EPA 1998
- Zinc Carbon (no mercury design)				type AAA – 9V dry cell	Env. Can. 1998
Fluorescent Lamps					
- Compact	0.010		g/unit		Poll. Probe 1996
- 4 ft. Lamp	0.023		g/unit	targeted reduction	Poll. Probe 1996
- 8 ft. Lamp	0.046		g/unit	targeted reduction	Poll. Probe 1996
- Various				fluorescent lamps contain 0.03% mercury	U.S. EPA 1994
- 40 Watt		~ 0.01	g/unit	contained 0.027g in 1995, target ~ 0.012 by 2000	Env. Can. 1998
High Powered Lamps					
- High Pressure Sodium		~ 0.01	g/unit		Env. Can. 1998
- Metal Halide	0.051		g/unit		Env. Can. 1998

PRODUCT/MATERIAL TYPE	MERCURY CONTENT MEAN	RANGE	UNITS	COMMENTS	REFERENCE
- Mercury Vapour	0.073		g/unit	used in early 1990s	Env. Can. 1998
MCT Semiconductors	–	–	–	alloy of mercury-cadmium-telluride	U.S. EPA 1994
Other Electrical Equipment	–	–	–	mercury in rectifiers, oscillators, motor switches, cathode tubes	U.S. EPA 1994
Switches & Gauges					
- Accustat	1		g/unit	precise temperature control	Env. Can. 1998
- Float Control Tilt	–	0.5-1	g/unit	sump pump, septic tank	Env. Can. 1998
- Plunger/Displacement Relay	–	up to 160	g/unit	high current lighting and heating	Env. Can. 1998
- Reed	–	0.14-3	g/unit	high precision analytical	Env. Can. 1998
- Silent	2.6	–	g/unit	light switch prior to 1991	Env. Can. 1998
- Tilt	2		g/unit	freezer light, washing machine	Env. Can. 1998
Thermometers					
- Household	0.5	–	g/unit	typical fever thermometer	Env. Can. 1998
- Laboratory	2.25	–	g/unit	basal air temperature thermometer (3% usage)	U.S. EPA 1997
- Lab/Weather	–	up to 3	g/unit	typical lab or weather thermometer	Env. Can. 1998
- Medical	0.61	–	g/unit	oral, rectal, baby thermometers (95% usage)	U.S. EPA 1994
Thermostats					
- Mercury Switch	~ 3	–	g/unit		Env. Can. 1998
- Thermostat Probes	~ 2.5	–	g/unit	gas appliances	Env. Can. 1998
Various Instrumentation	–	–	–	barometers, manometers, pressure sensors, valves, calomel electrodes	U.S. EPA 1994
Extracted and Refined Fuels					
U.S. Coals					
- Clean Coal	–	0.08-0.34	ppm	mercury content in clean coal (U.S. Geol. Survey)	Poll. Probe 1996
- Raw Coal	–	0.09-0.44	ppm	mercury content in raw coal (U.S. Geol. Survey)	Poll. Probe 1996
- Minnesota Coal	–	0.02-0.09	ppm		Poll. Probe 1996
- Anthracite	0.23	0.16-0.3	ppm	by weight	U.S. EPA 1997
- Bituminous	0.21	~ 0.01-3.3	ppm	by weight	U.S. EPA 1997
- Lignite	0.15	0.03-1.0	ppm	by weight	U.S. EPA 1997

PRODUCT/MATERIAL TYPE	MERCURY CONTENT MEAN	RANGE	UNITS	COMMENTS	REFERENCE
Subbituminous	0.10	0.01–0.3	ppm	by weight	U.S. EPA 1997
U.S. Oils					
Residual Oil	0.13		ppm		Pollut. Probe 1996
Residual Oil		0.007–0.17	ppm	mercury content of typical #6 oil	U.S. EPA 1997
Distillate Oil	0.07		ppm		Pollut. Probe 1996
Distillate Oil		0.12	ppm	mercury content of typical #2 oil	U.S. EPA 1997
Crude Oil		0.023–80	ppm		Pollut. Probe 1996
Crude Oil	3.5	0.007–40	ppm		U.S. EPA 1997
Crude Oil		0.02–2	ppm		Spectrum 2000
Crude Oil	6		ppm	crude oil used in U.S. carbon Black oil furnace process	U.S. EPA 1998
Bitumens, Asphalt, Solid Hydrocarbons		2–900	ppm		Spectrum 2000
Medical/Dental Materials					
Dental Amalgams	0.2		g/g amalgam	average mercury content per amalgam contains 50% metallic mercury in silver copper tin amalgam	Env. Can. 1998 Pollut. Probe 1996
Various Medical Reagents				mercury used in various disinfectants, diagnostic reagents, ethiopias, pharmaceutical diuretics, stains, etc. (e.g., mercurous chloride, mercuric chloride, mercuric sulphide, thimerosol, Zenkers solution, ammoniacal cobalt carbol fushin)	Pollut. Probe 1996
Miscellaneous Materials					
Cement Materials					
Clinker Product		0.01	ppm	mercury content in U.S. cement production	U.S. EPA 1998
Kiln Dust		0.5	ppm	mercury content in U.S. cement production	U.S. EPA 1998
Raw Mix		0.01	ppm	mercury content in U.S. cement production	U.S. EPA 1998
Waste Fuels		1.5	ppm	mercury content in U.S. cement production	U.S. EPA 1998
Lead Smelter Acid Plant	0.2		ppm	mercury content in Canadian smelter H2SO4 acid plant	Env. Can. 1998
Metals and Alloys				may exist as trace component due to surface amalgamation	
Sewage Sludge	1.8		ppm	average from Minnesota study	Env. Can. 1998

PRODUCT/MATERIAL TYPE	MERCURY CONTENT MEAN	RANGE	UNITS	COMMENTS	REFERENCE
Sewage Sludge	3.2	-	ppm	dry solids by weight	U.S. EPA 1997
Various Acids and Alkalis				may exist as trace component	
Raw Materials/Ores					
U.S. Metal Mine					
- Copper Ores		0.01–1	ppm	0.5 ppm mercury average	U.S. EPA 1998
- Gold Ores		0.1–1000	ppm		U.S. EPA 1998
- Lead Ores	0.004		lb Hg/ton		U.S. EPA 1998
- Lead (Missouri) Ore		< 2	ppm	lead smelter in Missouri	U.S. EPA 1997
- Miscellaneous Ores				unknown for silver, ferroalloy ores, etc.	U.S. EPA 1998
- Zinc Ores		0.1–10	ppm		U.S. EPA 1998
Various Mineral/Gangue Components					
- Aragonite	3.7		%	mercury content in $CaCO_3$	Spectrum 2000
- Barite	0.5		%	mercury content in $BaSO_4$	Spectrum 2000
- Calcite	0.03		%	mercury content in $CaCO_3$	Spectrum 2000
- Cerussite	0.1		%	mercury content in $PbCO_3$	Spectrum 2000
- Fluorite	0.01		%	mercury content in CaF_2	Spectrum 2000
- Galena	0.02		%	mercury content in PbS	Spectrum 2000
- Graphite	0.01		%	mercury content in graphitic carbon	Spectrum 2000
- Grey Copper Ores	14		%	mercury content in (Cu,As,Sb)Xsy	Spectrum 2000
- Hydrated Iron Oxides	0.2		%	mercury content in $Fe_2O_3nH_2O$	Spectrum 2000
- Marcasite	0.07		%	mercury content in FeS_2	Spectrum 2000
- Pyrite	2		%	mercury content in FeS_2	Spectrum 2000
- Pyrolusite	2		%	mercury content in MnO_2	Spectrum 2000
- Realgar	2.2		%	mercury content in AsS	Spectrum 2000
- Siderite	0.01		%	mercury content in $FeCO_3$	Spectrum 2000
- Sphalerite	1		%	mercury content in ZnS	Spectrum 2000
- Stibnite	1.3		%	mercury content in Sb_2S_3	Spectrum 2000

PRODUCT/MATERIAL TYPE	MERCURY CONTENT			COMMENTS	REFERENCE
	MEAN	RANGE	UNITS		
- Tetrahedrite	–	17.6-21	%	mercury content in $Cu_{12}Sb_4S_{13}$	Spectrum 2000
- Wurtzite	0.03	–	%	mercury content in ZnS	Spectrum 2000

References

Environment Canada (1998) "Inventory of Uses and Releases of Mercury During Product Life Cycles", Report prepared for Environment Canada by C.C. Doiron & Associates and Charles E. Napier Company Ltd. (November, 1998).

Sang S. and Lourie B.A. (1996) "Mercury in Ontario: An Inventory of Sources, Uses and Releases", Pollution Probe Report prepared for the Mercury Elimination and Reduction Challenge Project (September, 1996).

Scorecard (2000) Environmental Defence Fund, Chemical Profiles <www.scorecard.org>

Spectrum (2000) Chemical Fact Sheet <www.speclab.com>

U.S. EPA (1998) "Locating and Estimating Air Emissions from Sources of Polycyclic Organic Matter (POM)", Office of Air Quality Planning and Standards, Report EPA-454/R-98-014 (July, 1998).

U.S. EPA (1998) "Economic Analysis of the Proposed Rule to Modify Reporting of Persistent Bioaccumulative Toxic Chemicals Under EPCRA Section 313", Economic and Policy Analysis Branch (December, 1998).

U.S. EPA (1997) "Locating and Estimating Air Emissions from Sources of Mercury and Mercury Compounds", Office of Air Quality Planning and Standards, Report EPA-454/R-97-012 (December, 1997),fAppendix 12

U.S. EPA (1997) "Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States", Office of Air Quality Planning and Standards, Report EPA-452/R-97-004 (December, 1997).

U.S. EPA (1994) "Mercury Usage and Alternatives in the Electrical and Electronics Industries", Office of Research and Development, Report EPA/600/R-94-047 (January, 1994).

U.S. NTP (2000) National Toxicology Program <http://ntp-server.niehs.nih.gov>

Appendix 12 – Factor Information Retrieval Database

Basic FIRE Database Operating Instructions

The Factor Information REtrieval (FIRE) Data System from the U.S. EPA is a database containing U.S. EPA's recommended emission estimation factors for criteria and hazardous air pollutants. Refer to the information provided in your reporting kit for instructions on obtaining the FIRE database.

Facilities should refer to the U.S. EPA FIRE database manual that is downloaded with the program to ensure that you understand the use and limitations of the program, and of the emission factors provided. Emission factors are stored with information on the emitting process (Source Classification Code (SCC)), control devices and reference information.

Emission Factor Quality

Emission factors are usually based on a relatively limited number of tests on sources installed elsewhere that may differ slightly or substantially from the particular source being analyzed. If you are using the FIRE database, you will notice on the "Details" page a field titled "quality". This is a rating that the U.S. EPA uses to attach reliability to its published emission factors. The system is alphabetical with "A" being the most reliable and "E" being the least.

FIRE System – General Operating Procedure

When you open the program, you will have three tab options – Browse, Detail and Query. The rows in the "Browse" tab can be sorted by SCC, pollutant (POL) or control device (CTL). To determine which mode you are in, look above the "Browse" tab to see which of the three buttons appears to be selected.

- **Scrolling and Other Methods of Navigation**

  You can scroll through the list using either the up / down arrows, page up / page down, by selecting the "Move" menu, using the buttons on the tool bar, or using the scroll bar on the right of the screen. By using the "Go to…" button on the toolbar, you can search by SCC number, SCC description, CAS number, pollutant name, control code or control description. The default "Go to…" search is for the SCC number. To change this, you must select the desired criteria from the "Sort" menu.

- **Sorting**

  The "Query" tab can be used to filter the data by selecting the SCC, pollutant and controls. To set filter criteria, use the "Include…" button on the toolbar. After you have set the filter criteria, you must select the "Run" button on the toolbar. The results will automatically be displayed in the "Browse" tab.

- **Emission Factor Determination**

  The most efficient way to ensure you are using the correct emission factor is to make the "Browse" sheet active and select the "POL" and "Code" buttons on the top, right-hand side of the screen. Ensure that the SCC for the emission factors that you are reviewing describe the appropriate process. You can then scroll down to the substance of interest and determine which emission factor is relevant to the process you are analyzing. More information on using this program can be found in the "Help" files in the FIRE system.

- **Detailed Emission Factor Information**

  To view details of a specific emission factor, select the row for the emission factor of interest and then select the "Detail" tab. Information will be displayed on the emission factor quality, special notes, equations for the emission factor (if applicable), as well as other necessary information on the emission factor.